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HABITAT CONSERVATION PLAN

FOR THE

PREBLE'S MEADOW JUMPING MOUSE

FOR

THE CITY AND COUNTY OF DENVER'S

BOARD OF WATER COMMISSIONERS

FEBRUARY 3, 2003

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(*Zapus hudsonius preblei*)

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INTRODUCTION

The City and County of Denver, acting by and through its Board of Water Commissioners ("Denver Water") developed this Habitat Conservation Plan ("HCP") and submitted an application to the United States Fish and Wildlife Service ("FWS") for an Incidental Take Permit ("Permit") for the Preble's meadow jumping mouse, *Zapus hudsonius preblei* ("Preble's"). HCPs are required for activities having the potential to impact threatened and endangered species under the authority of section 10 of the Endangered Species Act of 1973, as amended ("ESA"). This HCP for the Preble's provides guidance for Denver Water's operations and management decisions over the next thirty years, and it is based upon the most current scientific knowledge available. Research for the Preble's is ongoing; therefore, this HCP may aid in the discovery of new information as well as be modified, if necessary, as new information is collected. This HCP addresses only the Preble's. It does not cover other federally-listed species, including the bald eagle (*Haliaeetus leucocephalus*), Canada lynx (*Lynx canadensis*), Pawnee montane skipper (*Hesperia leonardus montana*), Mexican spotted owl (*Strix occidentalis lucida*), Colorado butterfly plant (*Gaura neomexicana coloradensis*), or the Ute ladies'-tresses (*Spiranthes diluvialis*). Denver Water does not anticipate any effects on habitat or populations of these other species from activities covered in this permit. Actions that may affect these other species are either addressed through other permits or will result in additional future consultation with the FWS.

DEFINITIONS

Annual Monitoring Report: A report that Denver Water will submit to the FWS on a yearly basis containing information that reflects Denver Water's compliance with the HCP.

Best Management Practices (BMPs): Guidance provided in this HCP to avoid and minimize Take during Covered Activities and aid in the restoration of disturbed areas.

Block Clearance Zone: A zone where the FWS has determined that Preble's is unlikely to exist. ESA restrictions for Preble's do not apply within the defined Block Clearance Zone.

Conservation: Denver Water's management strategy in the Conservation Zones. This strategy focuses on two goals: 1) prevention of disturbance to existing Occupied and Potential Habitat through avoidance, minimization, and utilization of BMPs when practicable, recognizing, however, that impacts in the Conservation Zones will occur; and 2) replacing Occupied and Potential Habitat that is disturbed or removed through BMPs and Mitigation.

Conservation Zones: Three zones within the Permit Boundary that are specified by location: the North Conservation Zone, South Conservation Zone, and the High Line Canal Conservation Zone (Figures 4-6). The Conservation Zones include Denver Water properties that contain Occupied and Potential Habitat where the majority of the Covered Activities will occur. Conservation is the management strategy in the Conservation Zones.

Covered Activities: All Denver Water activities and projects addressed in this HCP. Covered Activities include operations and maintenance activities, foreseeable projects and activities, activities with insignificant levels of Take, and new activities and projects included through amendment of the HCP.

Denver Water: The City and County of Denver, acting by and through its Board of Water Commissioners, its employees, agents, representatives, consultants, contractors, sub-contractors and other parties over whom Denver Water has authority and/or control.

Mitigation: Denver Water's efforts to benefit the Preble's and offset Take resulting from the Covered Activities.

Occupied Habitat: Potential Habitat with suitable vegetative conditions for Preble's habitat within one stream-mile of a positive trapping location of the Preble's.

Permit: The ESA section 10 Incidental Take Permit issued by the FWS pursuant to FWS regulations and associated with the HCP.

Permit Boundary: The portion of the Preble's Range in Colorado under 7600 feet on Denver Water properties. The Permit Boundary includes Occupied, Potential, and Unsuitable Habitat and Block Clearance Zones.

Potential Habitat: Areas on Denver Water properties that meet the criteria of Preble's habitat as determined by the FWS guidance (USFWS, 1999). Preble's habitat generally has well developed riparian vegetation and relatively undisturbed grasslands at elevations lower than 7600 feet where trapping to date has not verified the presence or absence of Preble's.

Preble's Range in Colorado: Areas defined by the FWS that meet the criteria of Preble's habitat in Boulder, Douglas, El Paso, Adams, Arapahoe, Denver, Elbert, Larimer, Morgan, Weld, and Jefferson counties from an elevation up to 7600 feet on the western boundary.

Success Criteria: Criteria used when monitoring Mitigation to evaluate success of restoration or enhancement.

Take: As defined by the ESA, Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct with regard to a threatened or endangered species. Within the definition of Take in the Act, "harm" means an act that actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. While Denver Water does not believe that Take requirements can lawfully be applied to Potential Habitat when the existence of the species is unknown, for the sole purpose of implementing this HCP, Take means the disturbance or removal of Occupied or Potential Preble's Habitat.

Unsuitable Habitat: Areas on Denver Water's property that meet the criteria of Preble's habitat as determined by the FWS and identified by Colorado Division of Wildlife ("CDOW") Preble's habitat mapping but have been determined to be unsuitable through field evaluations and/or negative trapping data. Areas that are Unsuitable Habitat may have insignificant or no Take.

I. BACKGROUND

A. PROJECT HISTORY

Denver Water has complete charge and control over a water works system for supplying the City and County of Denver with water for all uses and purposes. The system is municipally owned, but the structure of Denver Water provides for autonomy, including its own personnel and funds separate and apart from that of the general purpose government.

Denver Water's day-to-day operation of the system consists of two separate but interrelated components: the water collection system and the treated water distribution system. The water collection system includes all diversion, collection and transmission facilities that store and distribute raw water prior to treatment (see Figure 1, The Water Collection System).

The water collection system provides water to the treated water system that, in turn, provides high-quality water at appropriate pressures to Denver Water's retail and contract customers. The entire system must be able to serve the daily and hourly demand variations typical of urban service areas.

1. The Water Collection System

The water collection system is divided geographically into the South System and the North System.

The South System is located in the Upper South Platte River watershed, upstream of Chatfield Reservoir. It is comprised of a series of storage reservoirs (Antero, Elevenmile, Cheesman, Strontia Springs) and trans-basin diversions from the Upper Colorado River through the Roberts Tunnel. The South System delivers water to Foothills and Marston treatment plants through Conduits 26 and 20, respectively.

The North System is located in the foothills of the Rocky Mountains to the north and west of the Denver metropolitan area. The North System includes several storage reservoirs (Gross and Ralston reservoirs, and Upper and Lower Long Lakes) that store water from South Boulder and Ralston creeks and trans-basin diversions that enter the system through the Moffat Tunnel collection system. The South Boulder diversion and canal conveys water from Gross Reservoir on South Boulder Creek to Ralston Reservoir. The North Collection System delivers water to the Moffat Treatment Plant through Conduits 16 and 22.

2. The Treated Water System

The treated water facilities and infrastructure owned and operated by Denver Water include:

- The Foothills, Marston and Moffat treatment plants, having a combined production capacity of 645 million gallons per day ("mgd");
- 17 pump stations with a pumping capacity of 1,100 mgd;
- 29 treated water storage reservoirs in 17 locations totaling 381 million gallons; and
- 2,464 miles of pipe, 35,022 valves, and 13,298 hydrants.

The existing water system can meet an annual demand of 375,000 acre-feet of water.

As part of Denver Water's collection, treatment and distribution systems, Denver Water owns and operates several ditches used for the delivery of non-potable water supplies. These include the High Line Canal, City Ditch, and the Farmers and Gardeners Ditch.

Denver Water also owns various properties (including easements), facilities and infrastructure throughout the North and South systems that are within the Preble's Range in Colorado.

3. County Habitat Conservation Plans

Preble's have been documented in seven Colorado counties: Boulder, Douglas, Elbert, El Paso, Jefferson, Larimer, and Weld. County-wide HCPs have been discussed, and in some cases drafted, but at this time no final county plans have been submitted to, and accepted by, the FWS.

4. Recovery Document

Section 4(f) of the ESA requires the FWS to develop and implement recovery plans for endangered and threatened species unless it finds a recovery plan will not promote conservation of the species. Preble's recovery planning, at this time, has not been finalized.

Denver Water's HCP team participated in Preble's recovery planning, document development, meetings, presentations, and comments. At this time, the Preble's Recovery Team has proposed a preliminary Draft Recovery Plan and has received informal comments on the Draft. The final Recovery Plan will not be adopted before the implementation of this HCP. Nonetheless, to the extent possible, Denver Water's HCP team considered the preliminary Draft Recovery Plan in developing Mitigation and monitoring strategies to provide a net benefit to the Preble's 4(d) Rules

5. 4(d) Rules

On December 3, 1998, the FWS proposed a Special Rule for the Preble's, published in the Federal Register, and soon afterwards modified and finalized the Special Rule. The Special Rule (hereafter referred to as "4(d) exemptions") establishes protective regulations pursuant to section 9 of the ESA. In 2000, the FWS proposed additional 4(d) exemptions and on May 22, 2001, added these additional exemptions to the Final Rule 1998 4(d) exemptions.

4(d) exemptions provide specific circumstances under which section 9 prohibitions do **not** apply to the Preble's. There are six Preble's 4(d) exemptions:

1. Rodent control;
2. Ongoing agriculture;
3. Maintenance and replacement of existing landscaping; and
4. Existing uses of water anywhere within Preble's Range in Colorado
5. Ditch maintenance; and
6. Control of noxious weeds.

These 4(d) guidelines are incorporated into this HCP as Covered Activities with insignificant levels of Take and were used to develop certain Best Management Practices ("BMPs").

6. Critical Habitat Designation

The ESA term "critical habitat" for a threatened or endangered species is defined as: specific areas occupied by the species, having physical or biological features essential to the species' conservation, and those areas that may require special management or protection. It also means areas outside those areas occupied by the species if such outside areas are determined to be essential for the species' conservation. ESA § 3. Thus, critical habitat designation may include specific areas found both inside and outside the geographic area occupied by the species. The FWS issued a draft proposal of critical habitat on July 17, 2002. The final designation is expected in or around June 2003.

Critical habitat constituent elements were defined in the draft rule as:

1. A pattern of dense riparian vegetation consisting of grasses, forbs, and shrubs in areas along rivers and streams that provides open water through the Preble's active season;
2. Adjacent floodplains and vegetated uplands with limited human disturbance (including hayed fields, grazed pasture, other agricultural lands that are not plowed or disced regularly, areas that have been restored after past aggregate extraction, areas supporting recreational trails, and urban/wildland interfaces);
3. Areas that provide connectivity between and within populations. These may include river and stream reaches with minimal vegetative cover or that are armored for erosion control, travel ways beneath bridges, through culverts, along canals and

ditches, and other areas that have experienced substantial human alteration or disturbance, and;

4. Dynamic geomorphological and hydrological processes typical of systems within the range of the Preble's, i.e., those processes that create and maintain river and stream channels, floodplains, and floodplain benches, and promote patterns of vegetation favorable to the Preble's.

In total, roughly 250 acres of critical habitat has been proposed on the following Denver Water properties (Appendix 4):

a. Strontia Springs Reservoir
b. Nighthawk
c. Kassler
d. Swayback
e. Oxyoke
f. High Line Canal at Plum Creek
g. Ralston Creek above Ralston Reservoir
h. South Boulder Diversion property near Spring Brook

Properties (a) through (d) appear to be mapping errors, and it is assumed that critical habitat is confined to adjacent federal properties. Properties (e) through (h) are discussed below.

Oxyoke has the greatest amount of proposed critical habitat (155 acres). There are no proposed actions or water conveyance infrastructure on this property.

The High Line Canal is conveyed under Plum Creek by a siphon, where approximately 15 acres of Denver Water property is proposed for critical habitat. This siphon has been in place since 1883 and may require emergency repairs during the term of this HCP. Such repairs would cause temporary impacts to Occupied habitat in the Plum Creek floodplain. The maximum probable temporary disturbance would be less than an acre.

A portion of the Long Lake feeder ditch is located within proposed critical habitat on Ralston Creek. This ditch is to be converted to a buried pipeline, and would result in the creation of .25 acres of upland habitat and result in temporary disturbance of 0.1 acres. Additionally, there is a flume and stream gage within the proposed critical habitat designation area. Maintenance of this infrastructure would have insignificant Take. Maintenance of the road will also result in insignificant levels of Take.

The South Boulder Diversion property has roughly 12 acres within proposed critical habitat. The road and canal within this area are features that are not considered habitat (Spring Brook underneath the canal is Occupied Habitat, however). During the term of this HCP, Denver Water might convert the canal and siphons to a buried pipeline. This may result in an estimated temporary impact of less than 0.5 acres. Maintenance of the road will result in insignificant Take.

Anticipated projects on proposed critical habitat would result in less than 2 acres of temporary impact on 3 critical habitat units. These impacts would have minimal effect on the primary constituent elements for each unit and would not result in adverse modification of critical habitat. This HCP establishes avoidance, minimization and Mitigation to offset these temporary impacts. These protection measures apply to both private and federal actions. This HCP would prevent greater alteration of the constituent habitat elements on properties (e)-(h) for Preble's than would be afforded under critical habitat designation. The authorization of activities in proposed/designated critical habitat through the HCP process is possible because the adverse modification of critical habitat is analyzed by determining the effects on one administrative part or unit of the critical habitat, not on a smaller scale of particular individual acres. In addition, Denver Water must minimize and mitigate for any effects caused by the authorized activity, which would offset or reduce the significance of adverse effects to the critical habitat. Thus, the overall net affect of authorized land use activities for a particular HCP can be brought within the range of effects which is allowable under section 7.

Should critical habitat be designated on Denver Water properties, it is Denver Water's intent that during any section 7 biological consultation for an activity within the Permit Boundary, the FWS will determine that adverse modifications to critical habitat will not result based on Denver Water's commitments under this HCP.

B. LEGAL REQUIREMENTS

1. ESA

Issuance of a Permit is subject to ESA section 7 consultation by the FWS. This consultation is an analysis that requires the FWS to consider the impacts that issuance of the Permit will have on the species for which it is being granted, as well as, other endangered or threatened species. With regard to these other species, the factors considered by the FWS are the indirect effects, effects on federally listed plants, effects on critical habitat, and whether the Permit is likely to jeopardize their continued existence or result in the destruction or adverse modification of critical habitat.

In this case, one of the considerations during the biological consultation under section 7 is the effects of issuance of an Incidental Take Permit under section 10. As defined in the implementing regulations for section 7, indirect effects are "those that are caused by the proposed action and are later in time, but still are reasonably certain to occur." Indirect effects analysis considers the impact on species outside of the Conservation Zone but within the HCP Permit Boundary or species inside the Conservation Zone but that are not directly covered by the terms of the HCP. This HCP does not address other endangered species, including the bald eagle, lynx, Pawnee montane skipper, Colorado butterfly plant or the Ute ladies'-tresses. Denver Water does not anticipate any effects on habitat or populations of these other species from activities covered in this permit. Actions that may affect these other species are, and will continue

to be, addressed through other permits, or will result in additional future consultation with the FWS.

2. NEPA

Issuance of the Permit is a Federal action subject to National Environmental Policy Act (NEPA) compliance. ESA and NEPA requirements overlap to an extent and consider many of the same factors discussed in the paragraph above. NEPA review also considers the impacts that Permit issuance has on non-wildlife resources (air and water quality, cultural resources, etc.). To satisfy NEPA requirements, an Environmental Assessment was conducted to address impacts associated with the HCP (Exhibit A, Preble's HCP EA).

3. Permit Holder, Permit Boundary

Denver Water is the sole Permit holder under this HCP. The Director of Planning, or his representative, is the contact person at Denver Water for this HCP. Additional contact persons will be reported to the FWS when necessary. Third party activities that impact Occupied or Potential Habitat on Denver Water properties are not covered under this HCP.

The Permit Boundary covers all Denver Water's properties within the Preble's Range in Colorado at or below the 7600 elevation line, thereby covering all existing properties and infrastructure owned, operated and maintained by Denver Water within its North and South collection systems and within its treated water system. (See Figures 2, The Northern Permit Boundary Map, and 3, The Southern Permit Boundary Map.)

C. THE PLAN AND PURPOSE

1. Purpose

Through this HCP, Denver Water may continue its Covered Activities, mainly operations and maintenance activities ("O&M activities") and projects, through avoidance and minimization, and, where practicable, implementation of applicable BMPs that avoid, minimize, and eliminate impacts to Occupied and Potential Habitat. Where impacts occur, Denver Water will conduct Mitigation proposed in this HCP. The primary purpose of this document is to enable Denver Water to continue necessary O&M activities and projects in compliance with the ESA. A second purpose is to describe Denver Water's goals and objectives to secure the long-term Conservation of Occupied and Potential Habitat currently existing on Denver Water's properties. This HCP provides the FWS with a tool to minimize and mitigate Take of Occupied and Potential Habitat. For Denver Water, this HCP provides long-term assurance that Denver Water's Covered Activities are permitted and in compliance with the ESA. This HCP promotes negotiation and compromise and provides an alternative to conflict and litigation.

2. Plan Overview

This HCP addresses Take of Occupied and Potential Habitat within the Preble's Range in Colorado that may result from Denver Water's Covered Activities. The majority of Take is expected within the Conservation Zones. However, the permitted amount of Take may occur anywhere within the Permit Boundary. This HCP is structured to provide guidance to Denver Water's employees, particularly with regard to the avoidance, minimization and reclamation guidance provided in the BMPs, Mitigation, and any other limitations or guidance set forth on a site-by-site basis, and to act as a guide for Denver Water's compliance with the ESA.

3. Mitigation

This HCP incorporates Mitigation to offset Take resulting from Denver Water's Covered Activities. Such Mitigation offsets Take that may result to Occupied and Potential Habitat but also will result in a net benefit to the Preble's and aid in its recovery. In addition to restoring temporarily disturbed Occupied and Potential Habitat, Denver Water has, to the maximum extent, selected other Mitigation for areas within the Conservation Zones that are within proximity to existing Occupied and Potential Habitat.

4. Guiding Principles

To develop this HCP, Denver Water's HCP team reviewed a series of guiding principles developed by the FWS, the Nature Conservancy (Pague and Grunau 2000; USFWS 2001), the Recovery Team, and the Science Team. The Recovery Team is a team of scientists from the FWS, CDOW, and affected interests from the states of Wyoming and Colorado who convened to prepare a Recovery Plan for the Preble's. The Science Team is a team of scientists from the FWS, the CDOW, academia, and consultants knowledgeable about Preble's who convened prior to the listing of the Preble's to identify threats they believe have caused Preble's to decline, and threat abatement concepts specific to drainages across the Front Range. Guiding principles are based on conservation biology theories developed by teams that included land managers, expert scientists, and regulatory staff. Guiding principles are useful aids for planning and policy development and were used to help construct the elements of this HCP.

Nature Conservancy Guiding Principles

- Larger reaches of habitat containing larger populations are better than equal or smaller reaches with smaller populations; begin conservation planning at the largest possible scale, at least incorporating the immediate watershed.
- Populations are influenced by adjacent land uses and landscape context. Conservation activities that consider only riparian vegetation or habitat are inadequate.
- At a local scale, interconnected or adjacent reaches of habitat are preferable to isolated reaches.
- Populations that are stable or increasing over time are better than populations declining over time.

- Populations geographically well distributed across their native range at local, regional, and range-wide scales, are less susceptible to extinction than species confined to small portions of the range.
- Populations representing the range of ecological variability (e.g., elevation, climate, stream order, soils, hydrology) at local, regional, and range-wide scales are less susceptible to extirpation.

FWS Recovery Team Guiding Principles

- Management by river drainage
- Research
- Local involvement
- Cooperative management
- Incentives
- Education programs

The Science Team identified the same principles above, with one addition. Therefore, the conservation strategies used in this HCP also include this additional principle:

- Conservative estimates of population sizes, habitat parameters, and conservation targets preserve options for adaptive management. Decisions based on fewer data warrant more conservative approaches.

5. Goals and Objectives

The overall goal of this HCP is to comply with the ESA through a plan that includes conservation, protection, restoration and enhancement of Potential and Occupied Habitat while allowing Denver Water to continue activities necessary to fulfill its mission of providing safe, high quality, reliable drinking water and reliable supplies of non-potable water. The HCP includes both Denver Water's federally permitted actions (e.g., 404 permits through the Corps) and its non-Federal actions that may result in Take. The goals for the Conservation Zones are to avoid, minimize and reduce Take through BMPs when practicable, and to replace Occupied and Potential Habitat through Mitigation and aid in Preble's recovery. The following goals and objectives are consistent with the strategies and scope of this HCP.

a. Goals

i. Denver Water Operation Goals

(a) Operate and maintain the water supply and delivery system while minimizing impacts to Occupied and Potential Habitat; and

(b) Avoid delay of or interference with O&M activities.

ii. Biological Goals

(a) To the extent practicable, conserve and protect Denver Water's properties with Potential and Occupied Habitat, including associated native plant and animal species;

(b) To the extent practicable, restore all temporarily disturbed areas within Potential or Occupied Habitat.

(c) To the extent practicable, protect corridor linkages (between separate drainages) for populations or potential populations of Preble's on Denver Water and neighboring properties;

(d) To the extent practicable, provide habitat connections to existing Occupied or Potential Habitat on Denver Water and neighboring properties;

(e) Educate Denver Water employees and the public about the Preble's, its habitat, threats and Conservation strategies; and

(f) Gain new information on Preble's through research and monitoring.

b. Objectives

i. Denver Water Objectives

(a) Assure flexibility within the Conservation Zones to Denver Water's operations, maintenance and other activities/projects.

ii. Biological Objectives

(a) Conservation within Conservation Zones;

(b) Focus Mitigation in areas that have the potential to improve connectivity and increase habitat for known Preble's populations;

(c) Avoid, minimize and Mitigate Take within the Permit Boundary through the use of avoidance, minimization, and BMPs when practicable and other Mitigation;

(d) Using modified ditch maintenance practices, maintain the High Line Canal as a potential linkage corridor;

(f) Conduct presence/absence surveys to evaluate whether Preble's will occupy newly constructed wetlands at Lehow Lake.

II. BIOLOGY

A. SETTING

The Permit Boundary includes approximately 6143 acres of Occupied and Potential Habitat on Denver Water properties in Boulder, Jefferson and Douglas counties. Most of these properties are managed in a natural state for supplying water to the Denver metropolitan area. The Permit Boundary extends from an upper elevation of 7600 feet in mountainous terrain, through lands in the Colorado piedmont at mid-elevations, down to the lowest elevations on the plains near Denver.

The Permit Boundary includes a variety of cover types that may provide Preble's habitat. The Permit Boundary's upper elevation habitats include mountain valleys on mid to large streams, with forested slopes and tree/shrub riparian areas. Mid-elevation habitats in the piedmont typically are found along small to large streams, with small streams being more typical. These habitats often have riparian areas with a well-developed shrub layer and associated upland habitats with native grasses and upland shrubs. Lower elevation habitats are similar to mid-elevation areas but with considerably more anthropogenic influences. Preble's may be found along some ditches and canals that provide the necessary mixture of required habitat components. Preble's are generally not found in urban areas, and the FWS has issued two Block Clearances in Colorado: the Denver metropolitan area and most of Colorado Springs are currently no longer considered to have viable Preble's habitat (FWS 1999, 2000).

Although there are differences in habitat features between the higher and lower elevation areas, all Preble's habitat is associated with permanent or ephemeral sources of water. Occupied and Potential Habitat exists on the following drainages or ditches/canals in the Permit Boundary:

- Upper South Platte River drainage
- Lower South Platte (Kassler/Waterton, Foothills and Strontia Springs)
- High Line Canal near Plum Creek
- South Boulder Creek and associated tributaries, including South Boulder Canal stream crossings
- Upper Ralston Creek
- Coal Creek

B. PREBLE'S

1. Distribution, Abundance and Density

The Preble's is a member of the Dipodidae family and is one of twelve recognized subspecies of the meadow jumping mouse (Hafner et al. 1981). Although the meadow jumping mouse is widely distributed across North America, the Preble's subspecies is found only in the Front Range of Colorado and in southeastern Wyoming. Meadow jumping mice are generally found in mesic environments across North America (Quimby 1951; Whittaker 1963). Preble's are known in Colorado from records that date back to the 1890s. Most of the information on Preble's was limited to distribution records until 1991. Historical records show that Preble's were found in Larimer, Arapahoe, Boulder, Adams, Denver, El Paso, and Weld counties (USFWS/CNHP Preble's database through 2000). They were found in Elbert County in 1997 (Meaney et al. 1997). It is likely that they have been extirpated from Denver and Adams counties in recent times, as reflected in many unsuccessful live-trapping surveys.

Preble's are restricted to mesic habitats in Colorado, which is a small proportion of the landscape. Dr. David Armstrong expressed concern to the FWS in the late 1970s that Colorado riparian areas were being permanently converted to other uses, and these uses would adversely affect the Preble's (personal communication, Preble's Technical Working Group, 1994). There was renewed interest in Preble's when they were found at the Rocky Flats Environmental Technology Site in Jefferson County in 1991 (EBASCO 1992). At the same time, the FWS commissioned a study to determine the status of Preble's populations and habitat in Colorado and Wyoming (Compton and Hugie 1992). That study found that many riparian areas are being altered by a variety of anthropogenic factors that are detrimental to Preble's. This was confirmed by a field study in 1995 when 11 sites where Preble's had been formerly found were re-trapped to determine Preble's presence or absence; Preble's were not found at any of the sites (Ryon 1997).

Due to the apparent rarity of Preble's and the loss of and continuing threats to its habitat, the FWS proposed the Preble's for listing in 1997; Preble's were officially listed as "threatened" in May, 1998 under the ESA (FWS 1998).

Based on the relatively few known historical records, it is likely that Preble's were never abundant in Colorado. They appear to be a small proportion of the small mammal community where they are found, generally less than 5 percent of the small mammals in riparian habitats (Armstrong et al. 1997). Work began in 1998 to determine Preble's abundance estimates in several areas in Colorado from mark-recapture methods. Preble's were permanently marked with passive integrated transponder tags (PIT tags) and capture/recapture data were analyzed in program MARK by all researchers (personal communication, Tanya Shenk, Preble's Science Team, February 1998). Site population estimates were converted to linear density estimates, expressed as # Preble's km^{-1} stream (White and Shenk 2000).

Density estimates were taken from Boulder, Jefferson, Douglas, and El Paso counties in Colorado. The two-year mean (1998-1999) of all sites was 32 animals km^{-1} stream (Table 1). Density estimates ranged from approximately 5 animals km^{-1} stream at Rocky Flats (Jefferson County), to 47 animals km^{-1} stream at the U.S. Air Force Academy in El Paso County. Work has continued in many of these areas from year 2000 to the present. These data indicate that Preble's density may vary considerably from one year to the next (see Castle Rock, Table 1).

Most of the mid to lower elevation Denver Water properties that have Potential Habitat likely have moderate to low density populations, based on nearby sampling at South Boulder Creek, Pinecliff Ranch, and Rocky Flats. This would include populations on Coal, Ralston, and South Boulder Creek. Populations have not been sampled on larger streams or in upper-elevation habitats on Denver Water properties, so the status of populations along the South Platte River is unknown.

2. Habitat

Typical habitat for the Preble's in Colorado consists of a matrix of riparian vegetation with associated upland grasslands with scattered upland shrubs (Armstrong et al. 1997; Shenk and Sivert 1998). The riparian vegetation component has variable composition, but shrub patches with scattered tree overstory is common. Riparian woody vegetation usually has a heavy understory of graminoids or herbs, and woody or leaf litter is often abundant. Soils are often saturated for enough of the growing season to support riparian shrubs and trees. The common vegetation theme in riparian areas is heavy cover with minimal open areas. However, Preble's do occupy areas with variable coverage on a larger scale.

Riparian stream systems in Colorado are subject to a variety of disturbance factors that affect the Preble's lifecycle. The primary concern is flooding. Many Colorado streams have peak hydrographs in early to mid June but also have storm events in early to mid-May. The timing and intensity of storm events may affect hibernating Preble's, which emerge from underground hibernacula from early to late May. A May 1999 flood on Monument Creek on the U.S. Air Force Academy property destroyed a hibernaculum found from a radio-collared Preble's the previous Fall (Rob Schorr, personal communication, 1999). Rocky Flats had a 25-year storm in late April 1995 that completely inundated all Preble's habitat on the site. Trapping in the following months did not indicate a reduction in Preble's levels, presumably because most were still hibernating in hibernacula higher in elevation than the storm surge (Mark Bakeman, personal communication, 2001).

The Plum Creek flood of 1965 (estimated at a 500-year flood) removed most vegetation from the banks of the Plum Creek watershed. However, it also deposited a tremendous amount of silt and sand on the creek banks, which became the substrate for the large willow community now found there. This shows the relationship between natural disasters and riparian succession. The first stage of this succession is colonization of sandbars by mesic grasses and forbs, followed by establishment of shade intolerant riparian shrub stands. Cottonwood trees will follow if seed sources and stream hydrology

are favorable (Johnson 1994); the tree canopy will eventually shade out understory components, including shrub and herbaceous understory layers. As the system matures, it probably becomes more unfavorable to Preble's, as illustrated on Coal and St. Vrain creeks in Boulder and Jefferson counties.

Upland habitat includes a variety of mid to tall grass types with upland shrub patches. Alfalfa fields are also used for habitat in some situations. These grasslands are usually at higher elevations than the immediate flood plain and would not be flooded during regular flood events, unlike much of the lower elevation riparian habitat.

Riparian habitat is the primary Preble's nesting area, but feeding, mating, hibernation, and dispersal are strongly suspected in this area as well. Upland habitat serves as the primary hibernation site, often in association with upland shrubs. Preble's feed in upland areas during evening hours, and social gatherings with unknown implications have also been observed here (Shenk and Sivert 1999).

Preble's have been found on a variety of stream types, but most populations are found on first or second order streams. Streams may be braided or meandering, with permanent or intermittent flows. They often have shallow banks (less than one meter in height), with a lateral saturated zone that can support riparian vegetation to a width that is usually at least 3 meters.

Preble's are known to exist in some ditch/canal habitats in Boulder and Douglas counties. Preble's have been found on some ditches in close proximity to South Boulder Creek (Meaney et al. 2001) and St. Vrain Creek (Ensight 1997) in Boulder County. They were recently discovered on a section of the High Line Canal near Plum Creek at Chatfield State Park in Douglas County (Ensight 2001).

Occupied ditch segments often have a well-developed shrub layer on the ditch banks. However, there have been many ditch surveys where Preble's have not been found despite the presence of heavy shrub layers. It appears that in the majority of cases where Preble's have been found on ditches, the occupied sites are in close proximity to a natural stream drainage (South Boulder Creek [Meaney et al., 1997], St. Vrain Creek [Meaney et al., 1996], Plum Creek [Ensight 2001]). It is suspected that occupied ditches may have resident Preble's (South Boulder Creek), or Preble's may use the ditch for dispersal or hibernation (Plum Creek).

3. Reproduction

Little is known of Preble's reproduction in Colorado. The information that is available comes from field observations or from more detailed studies of other subspecies of meadow jumping mice.

Quimby studied captive adult meadow jumping mice from the mid-western United States (Quimby 1951). He found that captive-reared jumping mice had a gestation period ranging from 17–21 days. The young were born hairless, with about 4-7 young per litter. A deserted nest with five dead young was found at Rocky Flats; this

is the only record of young Preble's in a nest in Colorado (personal communication, Tom Ryon 2000).

Young jumping mice are confined to the nest (either above or below ground) for about three weeks, during which time they are entirely dependent on the female for nursing and protection. They may emerge from the nest for the first time at three weeks and begin to consume solid food but continue to nurse for another week. They are entirely independent by the end of week four (Quimby 1951).

Quimby indicated that meadow jumping mice can have two or three litters in one year. This has been generally confirmed in Colorado from dates of appearance of juvenile Preble's, Preble's weights, and condition of pelage. Preble's pelage develops slowly over the course of the first year. The black dorsal band takes approximately 1.5–2 months to fully develop and can aid in determining approximate age. Weight can also help determine age; the Preble's Science Team adopted the convention that a Preble's that was equal to or greater than 15 grams is an adult, as per Whitaker's convention (personal communication, Preble's Science Team, 1998 and Whitaker, 1963) and this conforms with Colorado data (Quimby 1951). There are two major birth pulses: early to mid July and mid to late August, as determined from the presence of juvenile Preble's.

4. Mortality

Data on Preble's mortality in Colorado comes primarily from radio-collared animals (Shenk and Sivert 1999; CNHP 2000). Preble's are eaten by a wide variety of predators including raptors, snakes, fox, weasel, raccoons, housecats, and bullfrogs. Mortality in these cases may be affected by radio-collar placement. Road kill, handling stress (from research activities), exposure to elements during the active season, drowning, and trapping mortality are also documented. There has been considerable debate regarding the potential role of domestic housecats in mortality. This source of mortality may be overestimated, based on a number of studies in the literature that show that cats prefer easier prey (Voles with Dedicated Surface Tunnel Systems, from Anne Ruggels' presentation to Nature Conservancy Science Team, 2000).

Factors associated with hibernation are thought to be a major source of mortality (up to 70 percent) in Preble's subspecies found in New York state (Whitaker 1963). Various estimates of survival are available for Preble's populations in Colorado, including over-winter, active season, and annual survival values. Survival rates have large associated errors and do not account for Preble's that have moved away from trapping sites. Annual survival rates for sites at Castle Rock and Monument range from 2-37 percent of the resident population.

There is anecdotal evidence that Preble's may be susceptible to plague (personal communication Chris Pague 1999 Preble's Science Team meeting). Preble's disappeared from Woman Creek at Rocky Flats in 1994, the same year that Jefferson County had a plague problem with prairie dog towns. Whitaker (1963) indicates that Preble's have few parasites compared to other small mammals, with ticks being the most common parasite.

The average life span of the Preble's is unknown, but there are now several documented cases in Colorado of Preble's living to be at least three years of age (Ensight, Rob Schorr, and Tom Ryon, personal communication, 2000).

5. Movement and Behavior

Preble's have features that suggest they are good colonizers. They are adapted to an early successional stage of vegetation (shrub willows), they are not strongly territorial (Quimby 1951), they are omnivorous, allowing for more flexibility in selection of food sources, and they are excellent long distance travelers (as evidenced by known travel distances of 1.6 km, or 1 mile). These qualities are characteristic of a good colonizer (Wolff 1999) and suggest that Preble's can take advantage of connections between patches of habitat.

Connectivity of habitat patches is closely related to hydrologic pathways because Preble's movement is correlated with riparian corridors. This has been well documented by movement studies with radio-collared Preble's (Shenk and Sivert 1999, Kaiser-Hill 1999, CNHP 2001). Shenk's studies have shown that 90 percent of movements are within 91 meters (298 ft) of a stream (Shenk 2000). However, Preble's have occasionally been captured in upland habitats at considerable distances from drainage pathways. Examples include captures in agricultural fields in Boulder County that are considerable distances from the South Boulder Creek floodplain (Bock, et al., 2002).

Preble's habitat within a drainage may have riparian patches with thick cover interspersed with open patches. Open patches may be used for dispersal routes between the occupied patches.

Barriers prevent Preble's movement and can fragment populations. Information from several studies show that Preble's are surprisingly vagile when confronted with unfavorable habitat conditions. Preble's movement has been documented through a 93 meter-long (305 ft) concrete box culvert under I-25 on Dirty Woman Creek, with adult, juvenile, male and female Preble's making it through the culvert (Ensight 1999). On the same drainage, Preble's have moved past secondary roads where the stream is conducted through corrugated metal pipes, as well as through a town park that has remnant riparian vegetation that averages 15 meters (49 ft) in width. It is not known whether such movement across secondary roads occurs over the roads or through the culverts, but movement at I-25 is almost certainly via the culvert.

6. Hibernation

Preble's are among the most profound of mammalian hibernators, with the hibernation period estimated at 189 days (Armstrong et al. 1997). Adult Preble's begin to fatten in mid-August and are often in hibernation by September 15 (Pawnee Nat. History Soc. 1996). Juveniles born in August take longer to build fat reserves, which must reach about 20 percent for over-winter survival (Wunder 1996). Juveniles may be active until late October before they finally hibernate in order to obtain the weight needed to survive the hibernation period.

The earliest known date of emergence in Colorado is May 2, but most Preble's emerge around mid-May, with males emerging first (Bakeman et al., 1995).

Hibernacula are within underground burrows (30 cm depth, Armstrong et al. 1997) lined with leaves and other organic materials. Food is not stored, so survival is dependent on fat reserves. Hibernacula are usually located in upland positions removed from the riparian area, often in association with shrub patches. Schorr (2000) found four hibernacula at the base of willow shrub stands, and two at the base of gambel oak. Hibernacula were an average of 22.6 meters from the edge of the associated waterway.

Shenk and Sivert (1999) found eight potential hibernacula at three sites in Douglas County. All sites were associated with shrubs or trees and ranged from 23 to 341 meters from the main drainage, and from 10-105 meters from associated tributaries.

Preble's may move considerable distances to find hibernation areas, including up dry tributaries (Shenk and Sivert 1999). Upland habitat with shrub or tree cover, in association with riparian areas, should be considered potential areas for hibernation.

7. Food Preferences

Preble's are omnivores, taking advantage of whatever food supplies are available. As might be expected, they have seasonal variations in diet. A variety of arthropods, including soil larvae, probably constitute the bulk of the diet upon emergence in Spring. Fungi are also consumed during this period. As the active season progresses, grass seeds become the favored food item. Arthropods supplement the diet as Preble's begin to fatten prior to hibernation.

These general dietary items and patterns are confirmed from a few sites in Colorado through analysis of fecal pellets (Shenk and Sivert 1999; Shenk 2000; Ensight 2001). It is further evidenced that Preble's diet is governed more by availability than preference (Armstrong et al. 1997).

8. Western Jumping Mouse and Preble's Distinction

The Western jumping mouse (*Zapus princeps*) is another member of the Dipodidae family that occurs in Colorado, and it is also found on Denver Water properties. It, however, is not an ESA-listed species. This animal is very similar to Preble's in appearance and general ecological requirements. Western jumping mice are also true hibernators found in riparian habitats but can live at a higher average elevation range than Preble's. Although Western jumping mice are generally larger than Preble's, there is overlap in body size between the two species and they cannot be distinguished in the field.

There is recent evidence that the Preble's and Western jumping mice have sympatric ranges, primarily at the upper elevation range of Preble's (Connor 2001). On Denver Water properties there are areas of sympatric ranges, primarily in the Upper South Platte properties. FWS has indicated that until further information is available on Preble's/Western meadow jumping mice distribution, it will be assumed that meadow jumping mice from this region below 7600 feet are Preble's. Denver Water will use adaptive management techniques if new information or guidance becomes available that will enable more specific determinations of the range of each of these species.

9. Field Observations and Occurrence in Project Vicinity

Denver Water's properties within the Preble's Range in Colorado have been evaluated through visual inspection or trapping surveys to determine whether Potential or Occupied Habitat exists. Through trapping surveys, Preble's have been found on or near several Denver Water properties. Evaluated areas are summarized below:

a. The Upper South Platte River

Preble's are known or suspected to exist on several sites on or near upper elevation areas on the South Platte River or tributaries. These areas include, but are not limited to: Trout Creek, South Platte River (Ouzel campground), Indian Creek, an unnamed tributary at Trumbull (Ensight 2002), Wigwam Creek, Phantom Creek, Trail Creek, Bear Creek, and the North Fork of the South Platte River (Rob Schorr 2001; Ensight 2000, 2001; CNHP database 2001). This region overlaps with the range of the Western jumping mouse. Preble's have been identified at Trout Creek, South Platte River, and Indian Creek on the basis of the presence of a molar anteriomedian fold (Schorr 2001). However, this single characteristic may not be reliable to distinguish the two species in all cases, and identifications should be supplemented with additional morphometric measurements (Conner 2001).

Most capture sites in this region have been within riparian corridors, where alder (*Alnus tenuifolia*) and blue spruce (*Picea pungens*) are more important components of the vegetation community than at lower elevations and where willow and cottonwood are more prevalent. Riparian habitats also appear to be more limited in mountainous terrain than at lower elevations, especially riparian shrub layers. Although willow/alder stands are not uncommon, they are not as extensive at lower elevations due to steeper terrain features and more extensive tree overstory conditions.

Most trapping surveys have indicated that Preble's numbers have been relatively low in the Upper South Platte River region, with less than 5 Preble's captured during surveys of varying intensity. Although most of these upper elevational studies were not conducted to assess relative abundance, it does appear from the low numbers of Preble's captures in these areas that habitat on the Colorado piedmont generally can support higher Preble's densities than higher elevational sites can. There have been no trapping surveys on Denver Water properties in this region to quantify populations.

Methods for positive identification of Preble's and Western jumping mice in this area remain unresolved. It is likely that both species occur and may be sympatric. Denver Water will assume Preble's may occur in this region until there is future FWS guidance on how to distinguish the two species. This area is Potential Habitat.

b. Lower South Platte

Kassler and Waterton Canyon

In 2002 there was one negative trapping survey on Denver Water's Kassler property near Waterton Canyon at the Last Chance Ditch headgate at the South Platte and along a 1000 foot segment of the river (Greystone, 2002). Habitat in the canyon is very patchy, with small to large sandbar willow stands (*Salix exigua*) separated by unsuitable habitat features including steep canyon walls and rip-rapped side slopes.

There is Occupied Habitat along the South Platte River about 2.5 miles north of the Waterton Canyon area at Chatfield State Park (CNHP 2000). There are possible habitat connections between Waterton Canyon and Chatfield State Park. Although Potential Habitat in Waterton Canyon appears to be lower quality than at Chatfield, Denver Water includes the Waterton/Kassler section of the South Platte River as Potential Habitat unless or until research or data proves otherwise.

Foothills

Both Little Willow Creek and an unnamed tributary of Willow Creek run through the Foothills property, and both have sections of Potential Habitat. Preble's have been captured in Roxborough State Park on Little Willow Creek, 1.1 miles to the south, and on an unnamed tributary of Willow Creek, 0.8 miles southwest of the Little Willow Creek site (Meaney et al. 1997).

Little Willow Creek flows under the access road towards the Foothills Treatment Plant and then flows north through a new subdivision. On the east side of Rampart Range Road (the main road), habitat is marginal but Potential. The creek channel has been heavily downcut on both sides of the access road. There is riparian vegetation in the very bottom of the channel, which appears to be stable and established, with peachleaf willow trees that are probably at least 20 years old. Although current habitat conditions at this site are marginal, the site seems to have viable linkages to better habitat found in Roxborough State Park.

The unnamed tributary of Willow Creek was evaluated to the northeast of the Foothills drying basins. This area generally has Potential Habitat, but the stream channel is down-cut. There is a large ranch on the east side of the creek off Park Road, and ranching operations have degraded habitat in the vicinity of the ranch buildings. There have been negative trapping surveys downstream of the Foothills plant on both Willow and Little Willow Creek, despite patches of Potential Habitat. Preble's were found on Little Willow Creek in a 2002 survey between the Waterton Canyon Road and the new Roxborough development.

At Foothills, Denver Water will consider the Willow and Little Willow Creek stream stretches Potential Habitat.

Deer Creek

Conduits 20 and 10 carry the Board's water supply and run parallel to Wadsworth Boulevard (Highway 121) and cross Deer Creek near the arboretum. Deer Creek was surveyed in 1995 for Preble's (Mark Bakeman, personal communication, survey conducted with Harrington and Deans, 1995), but none were found within the arboretum property. Deer Creek was more recently surveyed upstream of the arboretum, again with negative results (Colorado Urban Wildlife, 2001). There is no clear habitat connection between the Deer Creek inlet at Chatfield Reservoir and the Chatfield location on the South Platte River where Preble's were previously found. Therefore, the Deer Creek area west of Wadsworth Boulevard is Unsuitable Habitat.

Conduit 26

Conduit 26 runs from Foothills Water Treatment Plant southwest to the east side of Strontia Springs Reservoir. The conduit crosses Little Willow Creek (Potential Habitat) and the hogback near the Water Treatment Plant, and then passes through ponderosa pine/Douglas-fir forest. It crosses a few ephemeral drainages (Mill Gulch), but the upper areas of these drainages where the conduit crosses are in forest cover and do not have the shrub patches typically used by the Preble's. The conduit crosses Stevens Gulch close to Strontia Springs Reservoir and the South Platte, and there are suitable patches of habitat near the river. The area on Stevens Gulch 600 feet upstream of the South Platte will be considered Potential Habitat, but the upper mountainous areas of Conduit 26 are considered Unsuitable.

Strontia Springs

Strontia Springs Reservoir is located on the South Platte River about six miles upstream of the Kassler facility. There is a tall dam on the river at an elevation of 6000 feet, and the reservoir backs up the river for approximately 1.5 miles. The dam is likely a barrier to Preble's movement on the South Platte River. There have been positive trappings on Bear Creek, a tributary that drains into Strontia Springs Reservoir. The Bear Creek confluence contains Potential Habitat, as well as an unnamed tributary on the

northwest side of the reservoir. The shoreline of Strontia Springs Reservoir does not have riparian vegetation and much of it is exposed and bare. This shoreline is considered Unsuitable Habitat.

Platte Canyon Reservoir

Platte Canyon Reservoir has vegetation suitable for Preble's habitat on the south and southeast, perimeter of the shoreline, especially at the Little Willow Creek inlet and along the edges of the nearby High Line Canal. The north shore of the reservoir has a well-defined berm, with extensive rip-rap on the reservoir side, and an access road on top of the berm. The western shore is also rip-rapped with sparse vegetation and does not contain suitable habitat. The slope drops steeply down a grassy slope from this road to a second access road. There is a 20-40 foot wide strip of riparian vegetation between this second access road and the South Platte. The north side of the reservoir does not have suitable Preble's habitat, and due to the extensive distance between the reservoir and the South Platte and the open, disturbed features (berm and roads), it is unlikely that this area would serve as a habitat connector.

Platte Canyon Reservoir was live-trapped on two occasions in 2001. During the first survey, the northeast shoreline of the reservoir was trapped, along with an extensive section of the adjacent High Line Canal. The second survey covered several habitat areas including the southeastern shore of the reservoir (including the little Willow Creek inlet), Little Willow Creek between the Kassler Road and the High Line Canal, and the adjacent area of the High Line Canal. The second survey included the best potential Preble's habitat at the reservoir. Both surveys were negative for Preble's. While a Preble's was captured on Little Willow Creek within a stream mile of the reservoir, it is believed that the reservoir is currently Unsuitable due to the habitat conditions and trapping data. This is subject to change during the term of this HCP.

Conduit 133

Conduit 133 runs from the Foothills Treatment Plant south to the Kassler facility, routed along Rampart Range Road and is generally in non-riparian areas. The conduit crosses Little Willow Creek in two locations, and both of these areas will be considered Occupied Habitat.

Conduit 27

This conduit is routed from Foothills Water Treatment Plant northeast to Plum Creek near Titan Road, and then into areas covered by the Metro Block Clearance. It crosses a few dry gulches between the Water Treatment Plant and Titan Road; these areas were reviewed in the field on April 9, 2002, and were determined to be non-habitat. These gulches do not have any flowing water, and the lack of any riparian vegetation indicates that they are never wet enough to develop this important component of Preble's habitat. The Conduit 27 crossing at Plum Creek is considered Potential Habitat.

Unnamed Drainage South of Deer Creek at Conduits 10 and 20

At Conduits 10 and 20, there is a small, unnamed drainage just south of Fairview Reservoir and 1.3 miles south of Deer Creek. The drainage flows down steeply from the hogback to the west, and it flattens out in a small valley, with approximately a 0.25-mile stretch of trees and shrubs on the west side of Highway 121. The drainage flows under the highway into a maintained park area on the east side of the road. The conduits cross the drainage near the road on the west side. Although there is a small stretch of vegetation suitable for Preble's habitat on the west side of the road, it is very unlikely that there are Preble's here because of its isolated position (hogback to the west, maintained park east of the road). This area is designated as Unsuitable Habitat.

c. High Line Canal

The High Line Canal west of Plum Creek has extensive sections of vegetation suitable for Preble's habitat. Much of this vegetation includes mature cottonwood canopy with an understory of willow shrubs. The vegetation is confined to the banks of the canal; the steep canal banks prevent extensive lateral seepage. Uplands are often disturbed by livestock or residential development.

The most promising habitat areas on this stretch of the Canal were live-trapped in 2001 (near the South Platte at Waterton, Little Willow Creek inlet, Willow Creek inlet, Plum Creek). Preble's were only found at Plum Creek. A two-mile stretch of habitat centered on the Plum Creek capture sites is designated as Occupied Habitat. The remaining areas will be managed as per guidelines for the High Line Canal described in the Adaptive Management section of this HCP.

d. South Boulder Creek and South Boulder Canal Stream Crossings

Preble's occupy South Boulder Creek downstream of Eldorado Canyon, north to Baseline Road in the city of Boulder. Extensive work has been conducted on the Boulder Open Space habitat on South Boulder Creek and the associated ditches (Meaney et. al. 2001). The mean population density on South Boulder Creek from years 1997 to 2000 was 37.0 Preble's km^{-1} of stream, and the mean of Preble's on ditches was 60.7 Preble's km^{-1}.

South Boulder Creek Below Gross Reservoir

The area on South Boulder Creek between Gross Reservoir and Eldorado Canyon has not been surveyed for Preble's. The property is a mixture of public and private ownerships. Moderate to poor habitat was found in the stream sections that have been observed. In some locations steep, rocky banks prevent development of vegetation cover, and in most areas there is heavy tree canopy that retards development of an adequate shrub layer.

There have been no surveys on South Boulder Creek upstream of Eldorado Canyon. Much of this area has mature forest cover with limited shrub patches, but the existence of Preble's is possible and this area is considered to be Potential Habitat.

South Boulder Canal Stream Crossings

The South Boulder Canal crosses both Spring Brook and Doudy Draw. Much of the canal is cement-lined with little amount of woody vegetation. There are small patches of potential habitat on the canal, but these small areas are not likely to be occupied and would provide little benefit to the Preble's. Doudy Draw and Spring Brook crossings of the South Boulder Canal are Occupied and Potential Habitat, but the remainder of the canal is Unsuitable Habitat.

e. Rocky Flats Drainages (Woman, Walnut, and Rock Creeks)

Preble's are known to exist on multiple locations on Woman, Walnut, and Rock Creeks. Denver Water facilities only come in contact with Woman Creek at the South Boulder Canal; there are no habitat connections to Rock or Walnut Creeks on Denver Water properties. The South Boulder Canal/Woman Creek area is dry for most of the growing season with the exception of a very small riparian area at the crossing, which is probably due to leakage from the pipe. This location is in close proximity to Highway 93. The section of Woman Creek between the canal and the occupied area on Rocky Flats is approximately one mile in length and is degraded by heavy cattle grazing. This upper section of Woman Creek is Unsuitable Habitat.

f. Coal Creek

Preble's have been found on Coal Creek on Jefferson County Open Space (near Coal Creek Canyon) and on Boulder County Open Space (near the South Boulder Canal crossing and near Highway 93). Highway 93 was first successfully trapped in 1989 (Dawson 1989). The city of Boulder has done extensive trapping surveys on its property with mixed results; Preble's are found in some years but are not present on the same property in other years. In 2000 Preble's were captured on Boulder County Open Space near the Canal on Coal Creek. It appears that this area of Coal Creek has a small, but persistent population of Preble's and is therefore Occupied Habitat.

g. Leyden Gulch

Leyden Gulch has suitable vegetation for Preble's habitat along a main channel and a few associated side swales between the headwaters and Highway 93. Much of the area consists of herbaceous wetlands, but there are small stands of willow and upland shrubs in the headwaters area. This entire area was surveyed in 1997 and no Preble's were found here. Habitat conditions have not changed appreciably since the 1997 survey. Both upland and riparian areas are heavily grazed by cattle. Preble's have not been found on any other downstream areas of this drainage. The drainage is also isolated from any other potential habitat. Due to the extensive and negative survey that was conducted, this area is currently Unsuitable Habitat, subject to change during the term of the HCP.

h. Ralston Reservoir and Related Areas

Preble's have been found on upper Ralston Creek upstream of Ralston Reservoir and below the Schwartzwalder Mine (Fleming et al. 1996). The stream is narrow here, and riparian vegetation is less than 10 meters wide. The riparian zone is restricted by the dirt road (that is often adjacent to the stream) and the steep canyon walls.

The Schwartzwalder Mine property has a degraded riparian area, but Preble's could be able to move through this area to potential habitat upstream.

Ralston Creek downstream of Ralston Reservoir was trapped from the base of the dam east to Highway 93 with negative results (Ensight 1997). Habitat conditions have not changed appreciably since the 1997 survey. The shorelines of Ralston Reservoir, and Upper and Lower Long Lakes are extensively rip-rapped with small isolated patches of shrubs. The shoreline of Ralston Reservoir has no riparian vegetation except at the inlet. Unsuitable habitat in this area has been designated on the basis of extensive riprapped areas, bare shoreline, or isolation from the upper Ralston Creek population.

Upper Ralston Creek is Occupied Habitat. The remainder of the Ralston Creek area (Ralston Reservoir, Upper and Lower Long Lakes, lower Ralston Creek) is currently Unsuitable Habitat, subject to change during the term of this HCP.

III. HABITAT MANAGEMENT ISSUES

A. REASONS FOR LISTING THE PREBLE'S

The FWS considered several factors in its decision to list the Preble's as a threatened species (Federal Register 63 FR 26517). These factors include:

- The present or threatened destruction, modification, or curtailment of its habitat or range;
- Over-utilization for commercial, recreational, scientific, or educational purposes;
- Disease or predation;
- The inadequacy of existing regulatory mechanisms; and
- Other natural or manmade factors affecting its continued existence.

The destruction and alteration of habitat was cited as the primary factor supporting the listing, with inadequate regulatory mechanisms as a second cause. The FWS further indicated that these specific habitat alteration factors were associated with Preble's decline:

- Residential, commercial, and recreational development;
- Highway construction;
- Stream alteration in physical structure and hydrology;
- Grazing and conversion of grasslands to farms;
- Water development and flood control practices;
- Mining; and
- Threats from hazardous materials.

The State of Colorado's Preble's Science Team took a detailed look at threats to Preble's within Boulder, Jefferson and Douglas counties (Pague and Grunau, 2000 a,b,c). Stresses to Preble's were ranked on the basis of potential severity, scope of impact, immediacy of expression, and reversibility of the impact. This detailed analysis by a panel of Preble's experts was used in this HCP to guide threat/stressor abatement. A combination of ten stresses were ranked high for the three county total:

1. Habitat conversion through housing, commercial, and industrial construction;
2. Hydrological impairment or alteration;
3. Increased predation or competition by exotic species or enhanced natives;
4. Disease;
5. Fragmentation of habitat and corridors;
6. Travel corridor construction;
7. Habitat conversion into a large reservoir;
8. Rock/sand extraction;

9. Increased predation by domestic pets and enhanced populations of meso-predators;
10. Fire (catastrophic).

The Covered Activities are not related to stresses 1, 3, 6, 8 and 9. One Covered Activity is the conversion of South Boulder Canal to a covered ditch and underground pipeline. With the exception of stream crossings on the South Boulder Canal, this would take place in Usuitable Habitat.

As related to #2 above, the use of existing perfected water rights by Denver Water is not likely to impact the Preble's. This activity was evaluated on a range-wide basis for the Preble's in the 4(d) Rule May 1, 2001. It was determined that the activities covered by the rule do not have significant levels of Take.

The threat of disease to Preble's is also not related to Denver Water's Covered Activities. Disease transmission could potentially result from changes in land use and subsequent changes in animal communities that come in contact with Preble's. For example, if a change in land use led to new black-tailed prairie dog colonies adjacent to Preble's habitat, the probability of plague transmission would increase. The Covered Activities do not result in changes in land use.

Fragmentation of habitat corridors results in both loss of habitat and decreased mobility of Preble's between habitat patches. The majority of the Covered Activities will result in temporary and minor Occupied and Potential Habitat impacts, if any, and may include temporary disturbances on streams, reservoirs and canals. These activities might have some temporal impact on Preble's movement through such areas, but there will be no long-term effects on mobility. The Covered Activity of placing the South Boulder Canal below ground will not remove a potential habitat corridor between the tributaries of South Boulder and Coal creeks because the majority of the canal is Unsuitable Habitat, nor would it make a likely movement corridor. The important corridors are along the side tributaries and the main streams in this region, which are not within Denver Water's control.

Fragmentation can also lead to isolation of populations if Preble's movement ability is retarded or eliminated. Movement ability is valuable for both genetic diversity and population demographics. Maintenance of genetic connectivity does not mean constant movement. For example, a single reproductive individual dispersing from one population to another each generation can facilitate maintenance of a population and reduce inbreeding potential. High levels of connectivity can lead to positive changes at the population level. Connected populations are larger and have greater rates of genetic exchange. Connected populations can better survive catastrophic events; if a small part of the population survives a catastrophic event, survivors remain and re-colonize vacant habitat. These factors lead to greater population persistence. The opposite of connectivity, which is isolation, implies a greater probability of extinction. O&M activities may restrict Preble's movement on a temporary basis, but population isolation will unlikely result from any Covered Activity.

Catastrophic fire is a concern in the forested areas of the Upper South Platte River watershed because of the dangerous accumulation of woody fuels over several decades. In the 2002 Hayman fire, a total of 137,000 acres were burned in this area. Since the fire, Denver Water has conducted extensive restoration in upland and riparian areas on Cheesman Reservoir properties. Denver Water continues to cooperate with Pike National Forest and the Colorado State Forest in a fuel reduction program (the Upper South Platte Watershed Restoration and Protection Project (see XIII A. for further details) sensitive to Preble's habitat concerns.

Denver Water believes that none of the Covered Activities are likely to preclude recovery of the Preble's. In short, Denver Water's activities have minimal overlap with potential threats to the Preble's in a three-county area. The vast majority of associated impacts are temporary in nature. Denver Water acknowledges that there are deleterious effects even from temporary impacts, and that impacts to Occupied and Potential Habitat should be carefully minimized and successful restoration should be applied to disturbed lands. However, temporary impacts on small areas were not a factor in listing Preble's and will unlikely be a significant cause of its future decline or recovery.

B. HABITAT IDENTIFICATION AND ZONE DESCRIPTIONS

1. Habitat Identification on Denver Water Properties

Denver Water evaluated its properties below the 7600-foot elevation line to identify Occupied, Potential and Unsuitable Preble's habitat. The evaluation was conducted in several stages. First, a Geographic Information System (GIS) analysis was conducted with various data sources that are indicative of habitat suitability to identify the broadest definition of potential habitat on Denver Water property.

Data sources used in this analysis were:

- The FWS database on presence/absence surveys and historical known occurrences of Preble's;
- Denver Water properties data derived by Denver Water staff from internally produced 1:24,000-scale property maps;
- Hydrography (streams, lakes, ditches, canals) data derived from the USGS from 1:24,000-scale quadrangle maps;
- Elevation raster data (digital elevation models) derived from the USGS base maps;
- 100-year floodplain data for Boulder and Jefferson counties derived by 1:24,000 maps developed by the Federal Emergency Management Agency (FEMA);
- Potentially suitable habitat raster data developed by the CDOW; and
- The Denver Metro Block Clearance Area derived by ERO resources, depicting the area where the FWS has determined Preble's have been extirpated.

Using the following procedures a coverage of potential habitat was created. The following features were included as a first step in defining potential habitat:

- A dataset of hydrography (streams, waterbodies, ditches and canals) below 7,600 feet in elevation was created.
- A 100-year floodplain dataset was created (Douglas County absent from this database).
- Using the numerical ranking system employed by the CDOW to rank potentially suitable habitat, areas of High and Moderate potentially suitable habitat were established as a dataset.

The following features were refined or excluded because they overestimated potential habitat.

- Denver Water properties within the Block Clearance Area were eliminated from consideration.
- The South Boulder Canal was removed from the ditches and canals dataset because field evaluations indicated suitable habitat was present only at certain stream crossings. Therefore suitable habitat at the South Boulder Canal was retained by virtue of the CDOW data, field investigations and stream data. The High Line Canal was removed from the hydrography dataset also; however, potential habitat along the canal was retained due to its inclusion in the CDOW potential habitat modeling.
- Cheesman Reservoir, Ralston Reservoir, Upper and Lower Long Lakes, and portions of Platte Canyon Reservoir were removed from the hydrography dataset because habitat along the shorelines is unsuitable. Also, open water on Denver Water reservoirs, ephemeral lakes, ditches and canals were removed from the hydrography dataset because open water is not habitat.

The widest possible habitat widths were defined by:

a) adding 300 feet to the outer edge of the 100 year floodplain, where present,
b) adding 300 feet to the outer edge of CDOW high and moderate potential habitat,
c) adding 300 feet to the edge of streams and other water bodies to factor areas where CDOW and floodplain mapping was unavailable. This primarily occurred along the westernmost portions of the Cheesman property.

The areas described above were compiled to create a very broadly defined Potential Habitat coverage within the study boundaries. This Potential Habitat coverage was combined with Denver Water properties using a polygon overlay procedure to create a coverage for Potential Habitat on Denver Water properties.

Habitat inside Denver Water property was then classified according to the following criteria:

1. Habitat from steps a) through c) above was labeled Potential.

2. Potential Habitat within 1 mile of a positive trapping site was labeled Occupied.
3. Denver Water property not included in one of the habitat widths (a-c above) was not considered Potential Habitat.
4. Habitat that existed solely due to flood plain zones or canals/pipelines was labeled Unsuitable. This removed a very minor amount of property from Potential Habitat.

Two types of changes to these habitat classifications were conducted manually. First, because the GIS analysis overstated occupied habitat, all occupied areas were reassessed. The FWS views Occupied Habitat as being habitat within 1 stream mile of a positive trapping. However all of the area within a 1-mile radius of the positive trapping location was designated Occupied within the GIS analysis. For example, a positive trapping location on Spring Brook resulted in segments of several adjacent drainages that were within a 1-mile radius but greater than 1 stream mile away from the positive capture location being classified as Occupied. These areas were reclassified as Potential Habitat. The second situation that justified manual reclassification of habitat was when site-specific habitat suitability analysis and negative trapping data indicated that an area classified as Potential Habitat was Unsuitable. For example, Leyden Gulch is a drainage that is classified as Potential Habitat due to the CDOW habitat suitability modeling. Field studies indicate that there is marginal habitat at the site. Trapping surveys conducted along Leyden Gulch yielded negative results, and the drainage is isolated from other known Preble's populations. Therefore Leyden Gulch was reclassified as Unsuitable Habitat.

2. Habitat Identification and Zone Descriptions

Based upon this analysis, Denver Water properties contain 201 acres of Occupied Habitat, 5942 acres of Potential Habitat, with the remaining Denver Water property currently designated as Unsuitable Habitat, as reflected in Table 2. All Occupied and Potential Habitat areas are included in the Permit Boundary, and areas where the majority of Denver Water's activities occur are in the Conservation Zones described below.

3. Conservation Zones

Occupied and Potential Habitat having the management strategy of Conservation is included in one of the three Conservation Zones, specified by location: North Conservation Zone, South Conservation Zone, and the High Line Canal Conservation Zone (Figures 4-6). The overall management strategy in the Conservation Zones is Conservation of existing Potential and Occupied Habitat. Differences in management on specific properties result from factors such as: 1) the types of operations and facilities on the property; 2) biological significance of Mitigation at a site; and 3) need for flexibility to conduct Denver Water activities.

a. North Conservation Zone

The North Conservation Zone (Figure 4) includes approximately 293 acres of Potential and Occupied Habitat. It includes Denver Water's properties on South Boulder

Creek, the South Boulder diversion, and Ralston Creek. When practicable, Covered Activities will be conducted through avoidance, minimization or the use of BMPs to avoid or minimize impacts to Occupied and Potential Habitat. All impacts within this zone will be Mitigated through restoration of Preble's habitat, within or near the same location as the impact.

b. South Conservation Zone

The South Conservation Zone includes Kassler, Waterton Canyon, Strontia Springs and Foothills (Figure 5) and contains approximately 1393 acres of Potential and Occupied Habitat. There is Occupied Habitat on adjacent properties. Therefore, Conservation and any Enhancements of the habitat features on Denver Water properties in this zone may reduce impacts to Occupied and Potential Habitat on both Denver Water and neighboring lands or may allow for establishment of new populations on Denver Water or neighboring lands.

c. High Line Canal Conservation Zone

There are approximately 49 acres of Potential and Occupied Habitat in the High Line Canal Conservation Zone (Figure 6). This zone provides Conservation of Occupied Habitat through modified ditch maintenance practices. The High Line Canal at Plum Creek is Occupied Habitat and will be managed as such. All other trapping surveys along the canal have had negative results, demonstrating that Preble's are not likely occupying the riparian vegetation. Therefore, the High Line Canal beyond the Occupied area is designated as Unsuitable Habitat. Nonetheless, as a component of Mitigation, Conservation in this zone includes management of the canal west of Highway 85 as a potential Preble's habitat linkage corridor, allowing movement of Preble's from Plum Creek along the High Line Canal to other drainages towards the west. Adaptive management may apply if the trapping results conclude that management of the High Line Canal should be different than what Denver Water has proposed in this HCP (see Section XIV).

4. The Upper South Platte Properties

Denver Water's properties along the Upper South Platte River have roughly 4303 acres of Potential Habitat and 105 acres of Occupied Habitat. Most activities in this area have insignificant impacts and there are no foreseeable projects. However, if, during the term of this HCP, some Covered Activity will occur and will impact Potential or Occupied Habitat within the Upper South Platte area, Take will be quantified and included in the Annual Monitoring Report. Nonetheless, the Covered Activities and Mitigation to offset Take are expected to occur primarily, if not entirely, within the Conservation Zones during the term of this HCP. Routine O&M activities are estimated to temporarily impact less than one acre of Potential Habitat in the Upper South Platte area during the term of this HCP.

C. CATASTROPHIC EVENTS

Catastrophic events are chance occurrences of sudden environmental change that result in destruction of a large percentage of Occupied or Potential Habitat. Possible catastrophic events on Denver Water's properties include dam failure, fire, accidental spills of hazardous materials from roads or railroad, and floods. Because these catastrophes are unpredictable and rare, they are difficult to manage for. However, through Conservation efforts in this HCP, other properties within the Permit Boundary may, in the event of catastrophe, serve as refuge against such events. The Changed Circumstances section of this HCP addresses measures Denver Water will follow in the unlikely event of catastrophe.

D. OFFSITE CONSIDERATIONS

Preble's largely depend on a healthy and functioning riparian system and upland vegetation extending at least 300 feet of either side of the riparian area. On many Denver Water properties, Denver Water's ownership exists only along the riparian area. Therefore, establishing or maintaining Occupied or Potential Habitat will be dependent upon efforts by both Denver Water under this HCP and the neighboring landowners. As hydrologic functions become altered, water supplies/deliveries change over time, and adjacent Occupied or Potential Habitat degrades, the risk to Preble's within Denver Water's property boundaries will increase, with reduced flexibility in management options for Denver Water. Such off-site considerations have encouraged Denver Water to include Potential Habitat within the scope of this HCP and to direct Mitigation in those areas that will most likely benefit the species for long-term recovery.

E. TAKE

Because of uncertainty about how much Potential Habitat on Denver Water property is occupied or how many individuals or populations are likely to inhabit Denver Water properties over the life of this HCP, the number of Preble's actually subject to incidental take through capture, injury, or killing is difficult to estimate. Occupied or Potential Habitat destruction or modification resulting from the Covered Activities will be the basis of the quantification of Take for the purpose of this HCP and the Permit. Relatively minor levels of Take of Occupied or Potential Habitat may occur as a result of Covered Activities; the effect of such Take is expected to be minor or negligible as a result of the biological factors described above and because of the minimal amount and temporary nature of impacts to Occupied and Potential Habitat that the Covered Activities will have.

Through the use of any of the BMPs in Appendix 5 when they are applicable and practicable, Denver Water's actions in Occupied and Potential Habitat may avoid or minimize the threat of Take, and in some cases will not require further Mitigation. Otherwise, Occupied or Potential Habitat destruction or modification that still results from the Covered Activities will be offset by the Mitigation in Section IX.

Denver Water is authorized to Take up to 25 acres of Occupied and Potential Habitat through impacts from the Covered Activities at any one time with a maximum of 75 acres total disturbed over the term of this HCP. At this time, it is estimated that a maximum of 74 acres of temporary Take may occur. Although only one acre of permanent Take is foreseeable at this time, up to 10 acres of permanent disturbance is authorized through this HCP. However, the combined total of temporary and permanent Take shall not exceed 75 acres over the term of the Permit.

IV. UNSUITABLE HABITAT AND NONHABITAT FEATURES AND ACTIVITIES WITH INSIGNIFICANT TAKE

Certain Denver Water properties and features are nonhabitat, and activities there will not result in Take. Many Denver Water activities have insignificant impacts and will not rise to a level of Take. Nonhabitat areas and features are based on conclusions reached through data, surveys, and/or visual inspections that determine the area contains Unsuitable Habitat, or that the features are existing features and have no impact on Occupied or Potential Habitat. The activities having insignificant impacts are on-going activities, maintenance of existing features, or occur within an existing structural or physical footprint. These activities do not require Mitigation or monitoring.

A. UNSUITABLE HABITAT AREAS

Certain Denver Water properties within the Preble's Range in Colorado contain Unsuitable Habitat that is unlikely to improve. Evidence from trapping surveys, vegetation surveys, and photography demonstrates that these properties do not have suitable habitat and Denver Water may conduct activities without the threat of Take.

Other properties were determined to have Unsuitable Habitat based on negative trapping surveys, and may change during the term of the permit. Additionally, if currently Occupied and Potential Habitat is later determined to be Unsuitable through no fault of Denver Water, these areas may also be considered nonhabitat. Conversely, new evidence may indicate that Unsuitable Habitat has become Potential or Occupied Habitat. At the time of the implementation of this HCP, areas with Unsuitable Habitat include:

1. South Boulder Canal Except Doudy Draw, Spring Brook, and Coal Creek Crossings

Most of the South Boulder Canal is concrete-lined with steep banks, and vegetation is primarily upland grasses with scattered trees. Although there are scattered shrub patches, they are limited in extent and are usually surrounded by Unsuitable Habitat patches. Because of limited habitat, the canal would also be a doubtful dispersal corridor. The Doudy Draw, Spring Brook, and Coal Creek crossings of the canal are Potential or Occupied Habitat, but the remainder of the canal is Unsuitable Habitat.

2. Leyden Gulch

Leyden Gulch from Highway 93 west to the headwaters was trapped in 1997 (Ensight 1997). Habitat conditions have not improved since the 1997 survey. Grazing and drought conditions have negatively affected upland and riparian areas, and the drainage is isolated from known populations of Preble's. Preble's were not found in any locations; therefore, this area is Unsuitable Habitat, however, through adaptive management, habitat conditions may be reevaluated at the time of an activity.

3. Ralston Creek Below Ralston Reservoir, Including the Shoreline of Ralston Reservoir and Upper and Lower Long Lakes

Ralston Creek below Ralston Reservoir was trapped in 1997 and Preble's were not found. The Reservoir and Upper and Lower Long Lakes have riprapped shorelines and limited vegetation. Lower Long Lake has a series of small wetland complexes emanating from hillside seeps and leakage from Upper Long Lake. However, both lakes are isolated from other areas of Potential Habitat (especially Ralston Creek) and it would be very unlikely for a persistent, isolated population to survive here. Habitat conditions have not changed or improved since the 1997 survey. However, through adaptive management, habitat conditions may be reevaluated at the time of an activity.

The upstream section of Ralston Creek has a small population of Preble's, which is included in the North Conservation Zone. However, the steep banks of the reservoir, limited vegetation, and the high variation in water level preclude its habitat suitability. Therefore, Ralston Reservoir is Unsuitable Habitat. However, through adaptive management, habitat conditions on Ralston Creek below Ralston Reservoir may be reevaluated at the time of an activity.

4. Harriman Ditch and Conduit 15

Harriman Ditch and Conduit 15 are Unsuitable based on negative trapping results in the following surrounding areas:

- Fehringer Ranch
- Weaver Creek
- Stickford Lake
- Bear Creek
- Turkey Creek

Therefore, Harriman Ditch and Conduit 15 are Unsuitable Habitat.

5. Platte Canyon Reservoir

The north and east sides of Platte Canyon Reservoir have entirely riprapped banks with very little vegetation. The southern and eastern shorelines have habitat patches, and the inlet of Little Willow Creek in the southeast corner of the reservoir has extensive willow stands. Both the eastern shoreline and the area near the Little Willow Creek inlet were trapped in 2001 and Preble's were not found. While a Preble's was captured on Little Willow Creek within a stream mile of the reservoir, it is believed that the reservoir is unsuitable due to the habitat conditions described above and the negative trapping survey results. Platte Canyon Reservoir is Unsuitable Habitat. However, through adaptive management, habitat conditions at Platte Canyon Reservoir may be reevaluated at the time of an activity.

6. High Line Canal Except Near Plum Creek

The High Line Canal has been trapped in several locations; all trapping surveys have been negative with the exception of the section near the Plum Creek siphon. One mile of canal on either side of the siphon will be treated as Occupied Habitat, but the remainder of the canal is Unsuitable Habitat. As Mitigation, Denver Water will use applicable BMPs to conduct O&M activities, and the entire section of the canal west of the Denver metropolitan Block Clearance Zone will be managed as a Potential Habitat corridor.

7. Block Clearance Zones

At this time, the FWS has designated two Preble's Block Clearance Zones: a portion of the Denver metropolitan area and a portion of the Colorado Springs metropolitan area. This HCP incorporates these Block Clearance Zones in this HCP and the associated assurance that there will be no Take resulting from activities conducted in these zones. Any adjustment or expansion to the Block Clearance Zones or any designation of new Block Clearance Zones during the term of the Permit shall also apply to Denver Water through this reference and inclusion in the HCP through modification of the HCP, as necessary.

B. NONHABITAT FEATURES

The following features are existing features that, while they may exist within Potential or Occupied Habitat, are not habitat, and their existence alone will not have an impact on Occupied or Potential Habitat. Existing nonhabitat features include:

1. Parking lots (dirt or paved)
2. Structures (anything which is built or constructed, including without limitation, an edifice or building of any kind, any piece of work artificially built up or composed of parts joined together in some definite manner)
3. Water treatment plants, including associated detention ponds and sludge drying beds
4. Roads (dirt or paved), including access pathways to buildings and the actively maintained shoulder
5. Designated trails (dirt or paved)
6. Storage yards
7. Dams and inlet structures
8. Diversion structures
9. Conveyance structures including concrete lined canals, pipes and siphons
10. Headgate structures
11. Wells
12. Pumps
13. Valves
14. Scientific measuring devices, including stream gaging stations and water quality monitoring stations
15. Bridge crossings

16. Landscape features, including parks, playing fields, and fences

C. ACTIVITIES WITH INSIGNIFICANT IMPACTS

The following activities are Covered Activities having insignificant environmental impacts in general and are expected to result in insignificant levels of Take, if any, particularly where the activity is confined to an existing structure or facility. Therefore, the following activities may occur within the Permit Boundary with no Mitigation or monitoring.

1. Rodent Control within 10 feet of or inside of any structure. Preble's are generally not found in association with structures such as barns, houses or other buildings. Any Preble's mortality associated with trapping near these structures would be insignificant.
2. Ongoing agricultural activities. This exemption applies to ongoing agricultural practices but does not apply to new agricultural practices that increase impacts to, or further encroach upon, Preble's habitat.
3. Maintenance and replacement of existing landscaping and related structures and improvements. Some existing landscaping activities, such as lawn-mowing and gardening associated with residential and commercial development, golf courses, and parks, have disrupted Preble's habitat in certain areas. However, Take associated with continuous landscaping of an area is expected to be minimal and is not expected to adversely affect Preble's conservation and recovery efforts.
4. Irrigation and associated activities, including operation and maintenance of irrigation facilities, pumping, maintenance and operation of diversions and headgate structures.
5. Fence maintenance.
6. Scientific measuring device repair, rehabilitation, replacement and maintenance. This includes, but is not limited to, stream gaging stations and water quality monitoring stations.
7. Bridge crossing rehabilitation, repair and maintenance within the existing footprint.
8. Dam maintenance within the existing footprint.
9. Existing uses of water associated with the exercise of perfected water rights pursuant to state law and interstate compacts and decrees.
10. Existing manmade changes in hydrology, including without limitation, runoff from urban development, storm control, discharges from conduits for maintenance or emergency, diversion facilities and dams.
11. Domestic pet predation from existing development.
12. Maintenance of existing features listed in paragraph B of this section.
13. Weed control. Preble's meadow jumping mice may be taken incidental to noxious weed control that is conducted in accordance with:
    a) Federal law, including Environmental Protection Agency label restrictions;
    b) Applicable State laws for noxious weed control;
    c) Applicable county bulletins;

d) Herbicide application guidelines as prescribed by herbicide manufacturers; and

e) Any future revisions to the authorities listed in paragraphs (1)(2)(vi)(A) through (D) of this section that apply to the herbicides proposed for use within the species' range.

14. Ditch Maintenance (except at the South Boulder Canal and the High Line Canal, which are addressed separately in this HCP): Preble's meadow jumping mice may be taken incidental to normal and customary ditch maintenance activities only if the activities:

a) Result in the annual loss of no more than ¼ mile of riparian shrub habitat per linear mile of ditch, including burning of ditches that results in the annual loss of no more than ¼ mile of riparian shrub habitat per linear mile of ditch.

b) Are performed within the historic footprint of the surface disturbance associated with ditches and related infrastructure, and

c) Follow the Best Management Practices described below:

(1) Persons engaged in ditch maintenance activities shall avoid, to the maximum extent practicable, impacts to shrub vegetation. For example, if accessing the ditch for maintenance or repair activities from an area containing no shrubs is possible, then damage to adjacent shrub vegetation shall be avoided.

(2) Persons engaged in placement or sidecasting of silt and debris removed during ditch cleaning, vegetation or mulch from mowing or cutting, and other material from ditch maintenance shall, to the maximum extent practicable, avoid shrub habitat and at no time disturb more than 0.25 mile of riparian shrub habitat per linear mile of ditch within any calendar year.

(3) To the maximum extent practicable, all ditch maintenance activities should be carried out during the Preble's hibernation season, November through April.

d) All ditch maintenance activities carried out during the Preble's active season, May through October, should be conducted during daylight hours only.

e) Ditch maintenance activities that would result in permanent or long-term loss of potential habitat that would not be considered normal or customary include replacement of existing infrastructure with components of substantially different materials and design, such as replacement of open ditches with pipeline or concrete-lined ditches, replacement of an existing gravel access road with a permanently paved road, or replacement of an earthen diversion structure with a rip-rap and concrete structure, and construction of new infrastructure or the movement of existing infrastructure to new locations, such as realignment of a ditch, building a new access road, or installation of new diversion works where none previously existed.

V. OPERATIONS AND MAINTENANCE ACTIVITIES ON DENVER WATER PROPERTIES WITHIN THE PERMIT BOUNDARY

The Covered Activities included in this section are Denver Water's routine activities, mainly consisting of O&M activities for Denver Water's facilities and structures, that may occur on any or all of Denver Water's properties within the Permit Boundary. The majority of O&M activities occur within the Conservation Zones, but may, at some point, occur anywhere within the Permit Boundary. The following activities have the potential to temporarily or permanently disturb Occupied or Potential Habitat within the Permit Boundary and will utilize avoidance, minimization, and/or Mitigation to eliminate or offset any resulting Take.

1. New residential, commercial, institutional, industrial structures and facilities (includes water treatment plants)
2. New road and bridge construction or replacement
3. New recreational trail development
4. New recreational development (other than trails but including related structures and landscaping)
5. Stream channel/riparian area alteration
6. New ditch construction
7. Existing utilities replacement and construction of new utility lines
8. Channel improvements
9. Construction of temporary access roads
10. Vegetation management
11. Construction of temporary stream diversions
12. Temporary dewatering of construction sites
13. Construction of new scientific measuring devices
14. Hydropower installation
15. Fire hydrant construction and replacement
16. Siphon construction and replacement
17. Culvert construction and replacement
18. Diversion structure construction and replacement
19. Canal efficiency improvements
20. Other activities necessary to maintain and operate Denver Water's existing system

Impact Assessment: While these types of activities have the potential to disturb Potential or Occupied Habitat, they occur on an as-needed basis, are infrequent, and few of these activities are likely to occur during the term of the HCP. The most likely O&M activities to occur include the replacement of existing utility lines and construction of new lines. Therefore, it is anticipated that the majority of Take resulting from these activities will be temporary and is estimated to total 24 acres over the term of the Permit (see Table 2). If any permanent impact occurs, it will be covered under the Permit amount as described in Section III E.

VI. ACTIVITIES ON DENVER WATER EASEMENTS

In addition to routine O&M activities Denver Water conducts on its properties, in some instances, Denver Water may be required to conduct activities on the serviant estates of others within the Preble's range in Colorado where Denver Water holds easements, as required for the operation and maintenance of Denver Water's system. These activities can include, but are not limited to:

- Channel improvements to prevent damage to the serviant estates in association with delivery of water supplies;
- Improvements to the diversion structures owned and operated by others to allow for compatibility with Denver Water's operations; and
- Repairs to property damage.

Avoidance, minimization and Mitigation in this HCP may apply to all Covered Activities conducted by Denver Water that impact Occupied or Potential Habitat, including those that occur on Denver Water's easements and the serviant estate. At the time of implementation of this HCP, however, there are no foreseeable projects on Denver Water easements that will potentially result in Take, other than O&M activities, of which the majority will occur on existing features.

Impact Assessment: Any resulting Take associated with these types of activities are expected to be temporary and are included in the estimated 24 acres associated with O&M activities. Any resulting permanent impact (though none is expected) will be covered under the Permit amount, as described in Section III E.

VII. FORESEEABLE PROJECTS

The following Covered Activities are projects that are foreseeable at the time of implementation of this HCP. The Permit Boundary is the boundary for Denver Water's foreseeable projects that may impact Occupied or Potential Habitat; yet at this time, only the Conservation Zones contain foreseeable projects that are within Occupied or Potential Habitat.

A. NORTH CONSERVATION ZONE PROJECTS

1. South Boulder Canal

A foreseeable project on Denver Water properties along the South Boulder Canal is:

- Conversion of the South Boulder Canal and siphons to a buried pipeline

Impact Assessment: Up to 10 acres of temporary impacts at Doudy Draw and Coal Creek crossings could occur when/if the siphons are converted to underground pipelines. There is no foreseeable permanent Take associated with this project.

2. Ralston Creek Upstream of Ralston Reservoir

A foreseeable project on Denver Water's Ralston Creek property is:

- Conversion of the Long Lake Feeder Ditch to a buried pipeline

Impact Assessment: Burial of the Long Lake Feeder Ditch will result in temporary and negligible disturbance to upland and riparian Occupied and Potential Habitat adjacent to the canal, an estimated 0.10 acres of temporary disturbance. However, burial of the pipeline will result in the creation of 0.25 acres of upland Potential Habitat through conversion of the ditch to habitat in addition to the 0.1 acres restored.

B. SOUTH CONSERVATION ZONE PROJECTS

1. Kassler/Waterton Canyon

The following project is foreseeable for Denver Water's Kassler/Waterton Canyon property:

- Conduit W Construction from Foothills through Kassler: Conduit W will be a major conduit from Foothills Treatment Plant that will serve Denver Water's customers and provide operational flexibility. Conduit W will parallel Conduits 133 and 20, and will be phased in over the next 20 years.

Impact Assessment: Construction of Conduit W may temporarily Take up to 3 acres within the Kassler/Waterton Canyon area. The recovery of Waterton Canyon fish flows project has the potential for temporary and permanent Take within the South Conservation Zone. Permanent disturbances are likely to be less than 0.1 acres.

2. Foothills and Conduit 26 Properties

There are no foreseeable projects on Conduit 26 properties. Projects that are foreseeable on Denver Water's Foothills property are:

- Construction of new sewer line across Little Willow Creek

Impact Assessment: An estimated 1.5 acres will be disturbed at each stream crossing. These impacts will be temporary.

C. HIGH LINE CANAL CONSERVATION ZONE PROJECTS

The foreseeable projects in the High Line Canal Conservation Zone are:

- High Line Canal System Refinements

As part of Denver Water's System Refinement Projects, Denver Water intends to reduce deliveries of water to the lower one-third of the High Line Canal, thereby putting water, that is otherwise lost through seepage, to use in the municipal water supply. Nonetheless, deliveries will continue to be made through the segment of the canal that is included in the High Line Canal Conservation Zone.

Lining more permeable sections of the canal is also being evaluated as a foreseeable project. This would improve water delivery efficiencies if the lining would not detrimentally affect the riparian shrubs and trees along the canal. Any lining constructed in the High Line Canal would be limited to the bed of the canal, thereby permitting seepage that serves to irrigate adjacent riparian vegetation.

- Construction of a new treated water distribution line parallel to Conduit 27

An estimated 1.5 acres will be disturbed at the Plum Creek stream crossing. Disturbances will be temporary.

Impact Assessment: Because deliveries will continue to be made to the segment of the canal included in the High Line Canal Conservation Zone, no impacts are anticipated to occur as a result of the High Line System Refinement Project. Canal lining may result in a temporary disturbance to Occupied or Potential Habitat within the High Line Conservation Zone. Take will be included in the permitted amount, although the

potential disturbance level cannot be quantified at this time because the construction approach is not yet known. However, Take is expected to be temporary and insignificant.

VIII. AVOIDANCE AND MINIMIZATION

Before conducting a Covered Activity on Occupied and Potential Habitat Denver Water will determine whether avoidance and minimization efforts are applicable, practicable and can be used to avoid, reduce, or eliminate Take. Generally, the use of BMPs will be the most practicable avoidance or minimization effort because rarely, if ever, will Denver Water be able to avoid engaging in activities that are necessary for Denver Water's system. Appendix 5, "Best Management Practices," lists BMPs that may be applicable to Denver Water's routine O&M activities and projects. In some cases, the use of BMPs alone will avoid Take, and in those cases, neither Mitigation nor monitoring will need to occur. In other situations, BMPs will minimize Take. Where Take still results, Mitigation offsets those impacts. Consequently, Denver Water's long-term effort to use avoidance, minimization and BMPs to the extent practicable may result in a net benefit to the species.

A. AVOIDANCE

1. Efforts

To the extent practicable, Denver Water will review and consider implementation of avoidance efforts when planning Covered Activities. Avoidance efforts include not engaging in the activity, conducting the activity in a different location outside of Occupied or Potential Habitat, conducting the activity during the Preble's inactive season, and other similar efforts.

2. BMPs

When BMPs are applicable and practicable, their use may altogether avoid or eliminate Take.

B. MINIMIZATION

1. Efforts

To the extent practicable, Denver Water will review and consider implementation of minimization efforts when planning Covered Activities. Minimization efforts include decreasing the area of the activity, decreasing the duration of the activity, and other similar efforts.

2. BMPs

Additionally, when BMPs are applicable, their use may minimize Take. The Mitigation offered in this HCP will offset any Take that may still result.

IX. MITIGATION

The following Mitigation is offered to offset Take resulting from the Covered Activities. This Mitigation is proposed to offset the impacts to Occupied and Potential Habitat that Denver Water estimates may result from the Covered Activities without impairing Denver Water's necessary system operations and maintenance. Furthermore, Denver Water believes this Mitigation will result in a net benefit to the Preble's and aid in its recovery.

A. Mitigation to Offset Temporary Impacts

During the term of the HCP, no more than 25 acres of temporary impact will occur at any one time and not more than 74 acres will be temporarily impacted over the life of the Permit. To offset this impact, Denver Water will restore disturbed vegetation in Occupied and Potential Habitat according to the following conditions:

- Impact areas and successful restoration will be tracked in a project database;
- Once an impact area is successfully restored according to Success Criteria, that area will be deducted from the total impact area;
- The total impact area will not exceed 25 acres.

If Denver Water has impacts that are anticipated to exceed 25 acres at one time, Denver Water will consult with the FWS to determine mitigation to offset the additional impacts exceeding 25 acres. Such additional measures may include enhancements or preservation on properties containing Occupied or Potential Habitat.

B. Mitigation to Offset Permanent Impacts

Denver Water estimates that only one acre of permanent impact is likely to occur from the foreseeable and planned projects during the term of the Permit. To offset the foreseeable one-acre impact, Denver Water will:

- Create up to 0.25 acre of riparian shrub and 2 acres of upland habitat at Lehow Lake;
- Revegetate social trails and dirt roads at Kassler that are no longer in use; and
- Create up to 0.25 acres of upland Potential Habitat at Long Lake Feeder Ditch.

However, this HCP covers up to a maximum of 10 acres of permanent impacts. In the event that permanent impacts exceed the estimated 1 acre, that permanent Take will be offset by encumbering a conservation easement at a ratio of 8:1 or by enhancements at a ratio of 2:1 or a combination of preservation at 6:1 and enhancements at 1:1.

C. Other Mitigation

- Weed management in the Permit Boundary;

- Provide education, training, and information to Denver Water employees to recognize Preble's habitat, to refer to this HCP before conducting the Covered Activities within the Permit Boundary and to determine whether avoidance, minimization, or BMPs are applicable and practicable;

- From 1998 (time of Preble's listing) to time of implementation of this HCP (2002), Denver Water's ditch maintenance, primarily including mowing of shrubs and willows, along the High Line Canal was halted. Growth of any functioning Preble's habitat is in excess of what would have existed under previous operations and is currently in excess of baseline conditions in 1998;

- Special management of the Unsuitable portion of the High Line Canal through the use of ditch maintenance BMPs to preserve its possible significance and use as a possible Preble's habitat linkage corridor; the high side of the canal will not be mowed;

- Conduct a second trapping season at the High Line Canal in 2003;

- Population monitoring and research at Lehow Lake to determine whether creation of habitat results in successful introduction of Preble's from neighboring populations;

- Provide new trapping data that Denver Water may acquire during the HCP to the FWS for the FWS database.

X. MONITORING AND REPORTING

Section 10 regulations require that the HCP includes monitoring and reporting measures to determine whether the terms and conditions of this HCP are being complied with. Denver Water will perform 1) compliance monitoring and 2) effectiveness monitoring, the objectives of which are commensurate with the objectives of this HCP. Nonetheless, monitoring should be economical and avoid diverting funds away from Mitigation under this HCP. Except where specifically stated otherwise, monitoring will be habitat-based.

Monitoring will not be necessary in areas that are, at the time of an activity, determined to be Unsuitable Habitat, occur on nonhabitat features, or for activities with insignificant impacts, except as defined in Section XI of this HCP (Adaptive Management).

In general, monitoring activities will cover the following:

- Document pre-impact site conditions;
- Determine the extent of Take of Occupied and Potential Habitat (on a project basis and as an annual total tracked in a project database);
- Document post-impact conditions;
- Determine success of revegetating Preble's habitat that has been disturbed;
- Report on additional Denver Water actions, including initiation of Mitigation, discussion of BMPs utilized, if any, and other management decisions that address implementation of the HCP;
- Hold an annual meeting between Denver Water and the FWS; and
- Prepare an Annual Monitoring Report.

A. COMPLIANCE MONITORING

Compliance monitoring is primarily the responsibility of the FWS; Denver Water will provide the FWS with the information needed for compliance monitoring. The primary objective of compliance monitoring is to assure that the terms of this HCP are complied with and that authorized levels of Take are not exceeded. To assist the FWS in meeting its responsibility, Denver Water will submit the following information in the Annual Monitoring Report when applicable:

1. The amount of Take and successfully restored areas (reported in acres)
2. The progress of Mitigation and Enhancements
    a) HCP-wide:
        i) Implementation of the education program for Denver Water employees who work in the Permit Boundary

ii) Implementation of avoidance, minimization and Mitigation in the Permit Boundary
iii) Implementation of BMPs

b) North Conservation Zone:
i) Implementation of Long Lake Feeder Ditch pipeline conversion and Mitigation

c) South Conservation Zone:
i) Implementation of Lehow Lake wetlands creation

d) High Line Canal Conservation Zone:
i) Document presence of linkage corridor
ii) Implementation of ditch maintenance management practices specified in Adaptive Management.

B. EFFECTIVENESS MONITORING

Effectiveness monitoring determines if the anticipated impacts and amount of Take (effects) from the Covered Activities are occurring and if progress is being made toward the biological goals and objectives of this HCP. Generally, vegetation analysis and data analysis will be conducted for the HCP. The following variables will be measured and reported when applicable:

1. HCP-Wide Monitoring:

a) Restoration goals are primarily targeted toward documenting site conditions prior to disturbance, and returning sites to pre-disturbance conditions to the greatest extent possible. Determining site conditions before the disturbance can be done by several methods, and one or more of the following methods will be used:
i) Photographing the site;
ii) Listing plant species in the area and identifying State-listed noxious weeds and weed areas greater than 100 square feet;
iii) Visually estimating the amount of shrub, tree, graminoid and forb cover by line transects randomly located throughout the area. Transect length will be adjusted based on the dimensions of the area;
iv) Qualitative assessment of upland and riparian community structure, density, and important Preble's habitat features (if any) and relation to adjacent areas;
v) Creating a vegetation map of the site, which includes areas and locations of specific plant communities important to the mouse.

vi) In some instances, count individual trees or shrubs and map their locations, with the intent on replacing these individuals;

vii) After revegetation, document success by collecting additional data.

b) Denver Water will evaluate effectiveness of avoidance, minimization and BMPs by documenting the amount of Take that occurred and the amount that was avoided or minimized.

2. North System Conservation Zone:

a) Denver Water will conduct vegetation monitoring at Long Lake Feeder Ditch to evaluate success of the revegetation using Success Criteria.

3. South Conservation Zone:

a) Denver Water will monitor vegetation establishment at Lehow Lake using Success Criteria;

b) Denver Water will monitor/document continuity of shrub/tree patches on the high side of the High Line Canal and report results in the annual report.

C. SUCCESS CRITERIA

Denver Water will evaluate the success of restoration through Success Criteria. When Mitigation reaches Success Criteria, it is deemed successful and complete. Success Criteria for restoration is:

- In general, restoration will immediately follow project completion;
- Temporarily disturbed habitat areas will be revegetated by the end of the first full growing season following the disturbance action;
- Monitor restoration beginning in the year following restoration activities up to 5 years after Mitigation was conducted or until success is achieved;
- Success is achieved when shrub/tree vegetation (riparian and upland) cover is equal to or greater than 70 percent of the amount of cover that existed prior to disturbance, as measured by the line transect method, or a shrub-for-shrub or tree-for-tree replacement on small site;
- Success is achieved when upland graminoid/forb vegetation (riparian and upland) cover is equal to or greater than 70 percent of the amount of cover that existed prior to disturbance, as measured by the line transect method; and
- State-listed noxious weeds will be controlled to prevent competition with planted vegetation. Noxious weeds will not exceed 5 percent canopy cover in revegetated areas.

If, after the fifth year after restoration was conducted, success has not been achieved in accordance with the above Success Criteria, Denver Water may determine with the FWS to use an alternative management or site.

XI. ADAPTIVE MANAGEMENT

Adaptive management is employed when information is gained through new data, research or from new information regarding the biology of the Preble's. Adaptive management applies the concept of experimentation and data gathering to the design and implementation of plans and policies in the HCP. Adaptive management is an integrated method for addressing uncertainty. It can be used to examine and identify alternative strategies for meeting the biological goals and objectives of the HCP.

The use of adaptive management in areas of questionable Preble's habitat suitability, Preble's use, or Preble's presence will likely increase the potential for success within the HCP and the potential that new and useful information on Preble's biology will be acquired.

A. HIGH LINE CANAL

Adaptive management will apply to Denver Water's ditch maintenance along the High Line Canal pending the completion and results of the 2003 trapping survey on the portion of the High Line Canal that is not within the Plum Creek Occupied Habitat. Figure 8 illustrates the adaptive management strategy for the High Line Canal.

- The section of the High Line Canal near Plum Creek where Preble's were found will be treated as Occupied Habitat 1 mile east and 1 mile west of the capture location. Mowing will be allowed in June or July on the low side of the canal consistent with guidance in the proposed 4(d) rule: mowing of shrubs will not exceed 0.25 miles of mowed canal per mile of canal.
- Mowing will not occur on the high side of the canal.
- All other areas of the High Line between Waterton Canyon and U.S. Highway 85 (excluding the Plum Creek section from #1, above) will not be considered Occupied Habitat, based on current trapping results. Mowing the low side of the canal will take place between April and October.
- Denver Water will continue to manage vegetation on the canal banks, but will maintain the canal as a potential mouse corridor, even though it is anticipated that trapping surveys, if negative, will demonstrate that most of the canal could be labeled as Unsuitable Habitat.
- If Preble's are found on additional areas of the canal, Denver Water will manage these areas as Occupied Habitat as described above.

B. STRONTIA SPRINGS SEDIMENT REMOVAL

Over 800,000 cubic yards of sediment was deposited in Strontia Springs Reservoir as an indirect effect of the Buffalo Creek Fire in 1996 and subsequent flood events. For water quality reasons, and proper operations and management of the reservoir, Denver Water will be removing the sediment from the reservoir at some time during the term of this HCP. Feasibility studies are in process to identify practicable alternatives to remove

the sediment. Most likely, the project will impact areas within the South Conservation Zone. At this time, it is impossible to determine whether there will be an impact to Occupied or Potential Habitat, where the project impacts will occur, what the area size will be, and the extent of Take that may result. Therefore, Denver Water will consult with the FWS to help avoid and minimize project impacts. Denver Water will incorporate the project into this HCP and determine whether Take will be within the permitted amount.

Impact Assessment: It is estimated that 25 acres of land will be required for storage of the sediment. Although possible impacts to Occupied or Potential Habitat cannot be quantified at this time, 25 acres of temporary impacts have been included in the Permit amount.

C. EXPANSION OF THE FOOTHILLS TREATMENT PLANT

The Foothills Treatment Plant will be expanded to treat greater amounts of water during the term of the HCP. Plans for the expansion have not been finalized; given the existing regulatory environment, there is the likelihood of unknown, additional treatment processes that cannot be anticipated at this time. Therefore, Denver Water is not able to determine whether the expansion will impact Preble's habitat on the Foothills property at this time. When Denver Water has formulated the project plans, the FWS will be consulted. Denver Water will incorporate the project into this HCP, utilizing applicable avoidance, minimization and BMPs when practicable, and quantifying any resulting Take within the Permit amount.

Impact Assessment: Although possible impacts to Occupied or Potential Habitat cannot be quantified at this time, 5 acres have been included as an estimate of potential impacts. Therefore, any permanent or temporary impacts will be included in the Permit amount for this project.

D. HABITAT SUITABILITY DETERMINATIONS

1. Generally

Throughout the term of this HCP, Denver Water may, upon consultation with and concurrence of the FWS, determine (through trapping or field evaluations) that more recent information qualifies a property differently than what this HCP provides. For example, Potential Habitat may, before conducting a Covered Activity, be found to be Unsuitable, or property may become Potential or Occupied Habitat during the term of the HCP. Or, trapping surveys on adjacent property may provide insight as to whether Potential Habitat is Occupied. Such modifications and habitat descriptions will be discussed before the occurrence of any Covered Activity. This may result in minor modifications in the HCP reflecting new knowledge in habitat suitability/Preble's presence, and incorporating or removing projects or activities from the HCP.

2. Leyden Gulch, Platte Canyon Reservoir, and Ralston Creek below Ralston Reservoir

Leyden Gulch, Platte Canyon Reservoir, and Ralston Creek below Ralston Reservoir currently have Unsuitable Habitat based on negative trapping surveys, although all three sites have vegetative conditions suitable for Preble's. It is possible that these sites may become Potential or Occupied Habitat in the future. If Denver Water has future projects at these sites that may affect habitat, a site evaluation will be conducted. If the evaluation determines that vegetative conditions are suitable for Preble's, a trapping survey will be conducted according to the latest FWS guidelines. A negative survey demonstrates Unsuitable Habitat for a minimum of 3 years.

E. DE-LISTING OF THE PREBLE'S

Should the Preble's be de-listed during the term of this HCP, Denver Water and the FWS will consult to determine whether some or all of the commitments in the HCP are relinquished or modified/amended with the concurrence of all signatory Parties of this HCP.

XII. FORESEEABLE CHANGED CIRCUMSTANCES, UNFORESEEN CIRCUMSTANCES AND NO SURPRISES

A. UNFORESEEN CIRCUMSTANCES

Section 10 regulations (50 CFR 17.32) require that an HCP specify the procedures for dealing with changed circumstances and information that may arise during the implementation of the HCP. The term "unforeseen circumstances" as defined in this HCP is intended to have the same meaning as "extraordinary circumstances" as used in the U.S. Department of Interior's August 11, 1994 "No Surprises" policy. In addition, the "No Surprises" rule (50 CFR 17.3, 17.32 (b)(5) and (6); 63 FR 8859) defines unforeseen circumstances and describes the obligations of the permittee and the FWS in this HCP.

"Unforeseen circumstances" or "extraordinary circumstances" means changes in circumstances surrounding an HCP that were not or could not be anticipated by Denver Water and the FWS, that result in a substantial and adverse change to the status of the Preble's. In addition to its other obligations under the "No Surprises" rule, the FWS will have the burden of demonstrating that unforeseen circumstances exist, using the best scientific and commercial data available.

In the event of an unforeseen circumstance, the FWS will not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level agreed upon in this HCP without the consent of Denver Water. If neither the Mitigation in the HCP or the BMPs set forth to address changed circumstances and emergency actions address the impacts to Occupied and Potential Habitat resulting from some unforeseen circumstance, the FWS and Denver Water will negotiate necessary conservation efforts and Mitigation.

When additional conservation efforts and Mitigation are deemed necessary to respond to unforeseen circumstances, the FWS may require additional measures where the HCP is being properly implemented, but only if such measures are limited to modifications within the Conservation Zones or to the HCP's operating conservation program, and maintain the original terms of this HCP to the maximum extent possible.

B. NO SURPRISES

The "No Surprises" rule provides that in negotiating "unforeseen circumstances" provisions for this HCP, the FWS shall not require the commitment of additional land, water, or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level agreed upon in this HCP without the consent of Denver Water. Moreover, the FWS shall not seek any other form of additional mitigation from an HCP permittee except under extraordinary circumstances. If extraordinary circumstances warrant the requirement of additional Mitigation from an HCP permittee

who is in compliance with the HCP's obligations, such mitigation shall maintain the original terms of the HCP to the maximum extent possible and shall be limited to modifications within the Conservation Zones or this HCP's operating conservation program for the affected species. Thus, in the event that extraordinary or unforeseen circumstances adversely affecting the Preble's occur within the term of this HCP, additional mitigation requirements shall not involve the payment of additional compensation or apply to parcels of land available for development or land management under the original terms of the HCP without the consent of Denver Water.

C. CHANGED CIRCUMSTANCES

Changed circumstances represent unexpected but reasonably anticipated events or outcomes that may not conform to the goals and objectives of this HCP but should be planned for under the HCP. They include events such as wildfires, infestations, floods, etc. Recognizing that changed circumstances may be possible does not mean that such changes are probable. The purpose of identifying changed circumstances in this HCP is to provide the methods to recognize such changes and to implement appropriate adjustments in the HCP to accomplish the original goals and objectives or a modified set of goals and objectives. When the changed circumstances consist of events or conditions for which there is a well-known and effective response, then management at this level can be considered contingency planning.

Changed circumstances that are reasonably anticipated by Denver Water and the FWS are emergency situations that may occur from natural causes or from emergency situations directly related to Denver Water facilities or operations.[1] Denver Water may respond to changed circumstances (emergency actions) through the BMPs listed in this section and applicable BMPs listed in Appendix A.

Foreseeable emergency response situations include, but are not limited to:

- Repair of structures damaged by floods
- Cleanup of spilled toxic/hazardous materials and/or waste
- Repair, replacement and/or removal of failed structures and associated facilities
- Repair of structures that are eminently in danger of serious damage or failure
- Protection of structures and property from flooding
- Repair of utility failures
- Repair of ditch failures
- Cleanup and stabilization of landslides, slope failure, and debris flows
- Fire suppression and mitigation

[1] Emergency situations are the same as changed circumstances. They include the emergency repairs or protection of existing facilities, suppression or prevention of fires and floods, and/or cleanup of toxic or hazardous materials. Emergency activities are those activities that must be done immediately to protect public health or safety or to prevent imminent loss of human life or property.

- Snow removal activities outside of road rights-of-way when necessary
- Response to accidents
- Emergency road closures and reroutes
- Cleanup of tree blow downs on roads and structures
- Removal of beaver dams that will cause flooding of facilities
- Repair and replacement of headgates
- Repair and replacements of dams
- Emergency sedimentation and erosion control activities

Denver Water may use any of the following BMPs when they are applicable and practicable to address the emergency situation:

- Travel corridor accidents will be removed or cleaned as soon as practicable
- Emergency repairs will be completed as soon as practicable
- Access to emergency areas will be restricted to a single access to minimize disturbance
- Disturbance to habitat during emergency repairs and cleanup will be a minimal amount possible
- All temporary disturbances to habitat will be returned to pre-activity grades and revegetated as soon as practicable
- Applicable BMPs in Appendix 5

Upon a determination that an emergency situation listed above has occurred, Denver Water will communicate the circumstances to the FWS.

XIII. PROPERTIES AND ACTIVITIES COVERED IN OTHER DOCUMENTS

Denver Water is currently involved in Federal actions on Denver Water properties that are within the Preble's Range in Colorado. For these projects, the impacts associated with threatened or endangered species, including Preble's, are addressed in Biological Opinions, letters of concurrence, or other forms of agreement from the FWS. Therefore, the following Denver Water properties and the activities associated with them have been consulted on for Preble's impacts, including the mitigation to offset the impacts, and are acknowledged in this HCP. Take associated with these projects is not covered in this HCP.

A. THE UPPER SOUTH PLATTE WATERSHED RESTORATION AND PROTECTION PROJECT

The Upper South Platte Watershed Restoration and Protection Project is a joint effort between the U.S. Forest Service (USFS), the Colorado State Forest Service and Denver Water to improve forest health through timber cutting and prescribed fires. Denver Water's properties along the South Platte are the first properties to undergo forest treatment prescriptions.

Areas of treatment on Denver Water property include land along the South Platte River at the North Fork between Pine and Strontia Springs Reservoir and the land surrounding Cheesman Reservoir.

The FWS' Biological Opinion (BO) dated January 10, 2001, concurred with the USFS determination that the project "may likely adversely affect" the Preble's and other threatened or endangered species (BO p. 1). However, included in the final determination and addressed in the BO are Denver Water's management objectives in this area for reducing fire hazards, reducing tree loss from insects and disease, and improving forest health through harvest and prescribed fire to re-establish forest stands that better reflect historic conditions (BO p. 28). This BO is currently under re-initiation with the FWS and will be amended prior to issuance of the ITP associated with this HCP.

Under the project, Denver Water may construct new roads in furtherance of the project, subject to certain limitations. Additionally, project related and routine activities of Denver Water were included and considered in the FWS' BO. These activities include:

- Road construction to fuel treatment areas
- Creation of fuel breaks
- Management of mistletoe infestations
- Forest treatments of the project
- Pipeline, pumphouse construction, and development of defensible space around structures at Cheesman Reservoir for fire protection measures

- Construction of a boathouse and ramp at Cheesman Reservoir
- Upstream control gate outlet work
- Fire defenses around houses and structures owned by Denver Water that are not part of the project
- Noxious weed control in accordance with USFS and Bureau of Land Management ("BLM") integrated weed management plan and associated conservation measures
- Installation of six vault toilets
- Construction of a parking lot and new boat take-out
- Gill trail parking lot construction
- Upstream control gate outlet work
- Conservation measures for protecting federal species

Conservation measures for the Preble's under the project include forest restoration activities in Preble's upland habitat, conservation measures for construction of drainage crossings in Preble's riparian habitat, and additional Conservation measures for activities in Preble's habitat (BO pp. 8-9). Impacts to the Preble's specific to Denver Water's participation in the project and to all activities of Denver Water discussed in the BO is permitted to disturb a maximum of 2600 square feet of Preble's habitat, although habitat removal will be avoided and minimized where practicable (BO pp. 26-27). The FWS' review of the project determined that "neither the direct nor indirect effects of the project will jeopardize the continued existence of…the Preble's" (BO p. 28).

The BO for the Upper South Platte Project addresses any incidental take resulting from Denver Water's activities in this area that are included in the project, but not covered by this HCP.

B. HAYMAN FIRE RESPONSE

The 130,000-acre Hayman fire burned over 7000 acres of Denver Water property in the Upper South Platte Basin. Fire restoration activities have been accomplished through Natural Resources Conservation Service ("NRCS"), Environmental Protection Agency, and Corps of Engineers emergency response programs. Any impacts to the Preble's associated with these restoration activities are addressed in Biological Assessments/Opinions, but not covered in this HCP (NRCS, November 2002, EPA, December, 2002, U.S. Corps of Engineers, pending). This HCP does not address restoration, sediment control actions and other activities responding to the Hayman and Schoonover fires.

C. FEDERAL ENERGY REGULATORY COMMISSION LICENSE AT GROSS RESERVOIR

In March of 2001 Denver Water was issued a renewed license from the Federal Energy Regulatory Commission ("FERC") for hydropower generation at Gross Reservoir in Boulder County. Pursuant to section 7 of the ESA, the FWS was consulted during the

NEPA process and impacts to threatened and endangered species in the project vicinity were assessed.

The Gross Reservoir project boundary includes lands administered by the USFS and the BLM, and inundates areas reserved by the Federal government for power development. The area covered by the FWS' BO includes the Gross Reservoir project area and the Colorado River and the Platte River basin depletions.

The FWS consulted on the likelihood of adverse effects to listed species in the vicinity of the project and the Colorado and Platte rivers resulting from project depletions. The FWS also analyzed potential direct and indirect impacts on federally listed species on and near the project site that may be caused by the facility siting and its operation, as well as downstream impacts to species in Colorado and Nebraska resulting from project construction, operation and alteration of system hydrology.

The BO determined that Denver Water's impacts will not adversely affect the Preble's (BO p. 2). Activities of Denver Water that are included in this project are:

- maintenance of the dam and reservoir
- water storage and delivery operations
- expanding the outlet-works building so it can house the turbine
- construction of the overflow weir
- all activities required for compliance with the FERC license
- power plant construction and operation
- transmission line upgrading

Additionally, the BO covers "general operating plans for Gross Reservoir"—the storing and regulating of native and imported water under existing conditions and full use of Denver Water's existing water collection system. These operations include drawing down the reservoir before Spring runoff, draw-downs during drought and emergency conditions, filling in the Spring, and all other operations necessary to fulfill Denver Water's obligations to supply water for its customers.

D. LEHOW LAKE

Denver Water and the CDOW are joint partners in the creation of Lehow Lake, located at the Kassler Treatment Plant. Funds for the project were attained through a federal grant application. The FWS addressed project impacts associated with the construction activities in a letter of concurrence to Denver Water. That letter of concurrence, dated February 5, 2001, found there is no effect to the Preble's associated with the creation of Lehow Lake.

E. REUSE PLANT

Denver Water is constructing a water reuse plant that will pre-treat water that would otherwise discharge to the South Platte River from the Denver Metropolitan

Wastewater Treatment Plant in Adams County, Colorado. The June 7, 2000 BO on the construction and operation of Denver Water's Reuse Plant determined there is no effect on the Preble's. In this BO Denver Water committed to participation in the Platte River Recovery Implementation Program – a program that was implemented to develop water and land-based conservation measures to offset depletion impacts of existing and future water supply projects. The program is to serve as the reasonable and prudent alternative for water projects subject to section 7 consultation in order to avoid the likelihood of jeopardizing federally listed species and adversely modifying or destroying their critical habitats.

XIV. ACTIVITIES NOT COVERED BY THE HCP

The following activities are not Covered Activities unless otherwise specified in this section because they are activities conducted by third parties who use Denver Water properties or facilities. Third parties, including Denver Water's water distributors, are individually responsible for ESA compliance associated with their activities occurring on, partially on, or near Denver Water's properties. If a third party's activity falls under Section IV of the HCP or through the use of BMPs will have no impact to Occupied or Potential Habitat, then the third party's activity on either Denver Water properties or facilities within Potential or Occupied Habitat will unlikely result in Take and will not require a FWS permit. However, third party activities that may or will have an impact to Occupied or Potential Habitat within the Permit Boundary should be covered through a separate incidental take permit acquired and held solely by the third party.

A. DISTRIBUTOR TAPS

Seventy-seven water delivery entities or customers currently have contracts to receive treated water supplies from Denver Water. Thirty-nine raw water customers currently have contracts to receive raw water supplies from Denver Water. This HCP does not address activities carried out by any of its treated or raw water customers on customer-owned properties and facilities.

B. LESSEES

Denver Water has several long-term lease agreements on Denver Water properties within the Permit Boundary. These leases allow for grazing, recreational park construction at specific locations within the Upper South Platte properties, operation of a horse stable near Chatfield State Park and Plum Creek, and the operation of a miniature railroad on the Kassler property. This HCP does not necessarily cover activities carried out by lessees on Denver Water property.

C. ACTIVITIES NOT CONDUCTED BY DENVER WATER, ITS EMPLOYEES, ITS CONTRACTORS OR SUBCONTRACTORS, AGENTS, OR CONSULTANTS

Generally, activities that are not conducted by Denver Water, its employees, its contractors or subcontractors, agents or consultants are not covered under this HCP.

XV. TERM OF THE HCP, SUSPENSION, REVOCATION, REINSTATEMENT, RELINQUISHMENT AND EXTENSION

A. EFFECTIVE DATE AND TERM

The term of this HCP is the term of the Permit, thirty years with full renewal or shorter extensions possible upon mutual agreement of Denver Water and the FWS. The HCP will become effective upon issuance of the Permit from the FWS.

B. PERMIT SUSPENSION, REVOCATION AND REINSTATEMENT BY THE FWS

The FWS may suspend or revoke the Permit for cause in accordance with the laws and regulations in force at the time (applicable regulations are currently found at 50 CFR §§ 17.22(b)(8) and 17.32(b)(8), and the FWS may revoke the Permit based on a determination that the continuation of the Covered Activities would be likely to jeopardize the continued existence of the Preble's only if the FWS has not been successful in remedying the situation in a timely manner through other means as provided in the "No Surprises" policy.

C. RELINQUISHMENT OF THE PERMIT BY DENVER WATER PRIOR TO THE EXPIRATION OF THE TERM

At any time, Denver Water may relinquish the Permit in whole or in part, in accordance with the regulations in force at the time of such relinquishment (applicable regulations at the time of permitting issuance are currently found at 50 CFR § 13.26).

If Denver Water wishes to relinquish the Permit before the expiration of the permit, or if Denver Water wishes to relinquish the Permit as to any part (property or activity) as defined in the HCP, Denver Water will provide written notice of its intent to relinquish to the FWS for review at least 60 days prior to the activity to which relinquishment would apply. If any portion of the HCP is relinquished, the FWS will evaluate if such relinquishment will compromise the conservation strategy as described in the HCP for the species and Permit. Once the FWS has made the determination that Denver Water has adequately fulfilled the requirements up to the date of the notice, thus ensuring that any incidental take that has already occurred has been offset for the act and land so excluded, Denver Water will have no further obligation under the HCP. Denver Water will remain obligated to manage the remaining portion of the HCP under the Permit consistent with the commitments of the HCP.

XVI. PERMIT AMENDMENT AND RENEWAL

A. PERMIT AMENDMENT

Amendment of the Permit would be required for any change in the following: (a) significant revision of the Permit Boundary(ies)[2]; (b) listing under the ESA of a new species not currently addressed in the HCP that may be Taken by the same Covered Activities in the same boundaries; (c) significant modification of any important project action or Mitigation component under the HCP, including funding, that may significantly affect authorized Take levels, effects of the project, or the nature or scope of the Mitigation program; and (d) any other modification of the project likely to result in significant adverse effects to the Preble's not addressed in the original HCP and Permit application. Amendment of the Permit must be treated in the same manner as an original permit application.

B. HCP AMENDMENT

The HCP may, under certain circumstances, be amended without amending the associated Permit, provided that such amendments are of a minor or technical nature and that the effect on the species involved and the levels of Take resulting from the amendment are not significantly different than those described in the original HCP. Examples of minor amendments to the HCP that would not require a Permit amendment include, but are not limited to: (a) minor revisions to survey, monitoring, or reporting protocols; (b) minor revisions in strategies for handling Preble's impacts during activities covered in the HCP; (c) minor revisions in Covered Activities, procedures, or impacts; (d) minor revisions of the HCP's plan area or boundaries, including corrections or changes in Preble's habitat determinations; and (e) corrections or changes in land ownership.

To amend the HCP without amending the Permit, Denver Water must submit to the FWS, in writing, a description of: (a) the proposed amendment; (b) an explanation of why the amendment is necessary or desirable; and (c) an explanation of why Denver Water believes the effects of the proposal are not significantly different than those described in the original HCP. If the FWS concurs with Denver Water's proposal, it shall authorize the HCP amendment in writing, and the amendment shall be considered effective upon the date of the FWS' written authorization.

C. RENEWAL

Upon expiration, the Permit may be renewed without the issuance of a new permit, provided that the Permit is renewable, and that biological circumstances and other

[2] Removal of Potential Habitat to Unoccupied/Unsuitable Habitat and vice versa (additions of Potential Habitat), and changes made to maps to reflect such changes, does not require formal amendment of the Permit, but instead is a minor modification appropriate for amendment of the HCP.

pertinent factors affecting the Preble's on Denver Water properties are not significantly different than those described in the original HCP. To renew the Permit, Denver Water must submit to the FWS, in writing: (a) a request to renew the Permit; (b) reference to the original permit number; (c) certification that all statements and information provided in the original HCP and permit application, together with any approved HCP amendments, are still true and correct, or inclusion of a list of changes; (d) a description of what Take has occurred under the Permit; and (e) a description of what portions of the activities are still to be completed, if applicable, or what activities under the original Permit the renewal is intended to cover.

If the FWS concurs with the information provided in the request, it shall renew the Permit consistent with permit renewal procedures required by Federal Regulation (50 CFR 13.22). If Denver Water files a renewal request and the request is on file with the issuing FWS office at least 30 days prior to the Permit's expiration, the Permit shall remain valid while the renewal is being processed, provided the existing Permit is renewable. However, Denver Water may not Take listed species beyond the quantity authorized by the original Permit. If Denver Water fails to file a renewal request within 30 days prior to Permit expiration, the Permit shall become invalid upon expiration. Denver Water must have complied with all annual reporting requirements to qualify for a permit renewal.

XVII. FUNDING

Monitoring and implementation of Mitigation for the impacts associated with this HCP will require funding. Funding needs are limited to measures above and beyond the costs of routine O&M activities including, but not limited to, pre-construction, post-construction, Mitigation, Enhancements, monitoring reports and surveys. Funding from Denver Water will be provided prior to the commencement of a Covered Activity and its associated monitoring and reports. Denver Water has budgeted for this plan and activities in the 2003 Operations Plan of Denver Water's Budget ($30,000 in 2003). In consecutive years, it will have a separate line item in the budget.

XVIII. §7 CONSULTATIONS AND 404 PERMITS

The HCP provides avoidance, minimization, and Mitigation for the Covered Activities necessary to operate and maintain Denver Water's treated and raw water systems that may affect the Preble's and those activities that may also involve a Federal action. Therefore, this HCP considers section 7 consultations required by the FWS in Federal actions and is intended to provide sufficient offsetting measures for impacts to Preble's in Federal actions that are included in, or are a component of, Denver Water's Covered Activities. Federal permitting processes that were considered for both the Covered Activities and Mitigation and for which this HCP addresses associated impacts include, but are not limited to, special use permits issued by the USFS or BLM, Clean Water Act Section 404 permits issued by the U.S. Army Corps of Engineers, and permits and licenses issued by the FERC. Denver Water acknowledges that this HCP does not address effects to species other than the Preble's that may also be the subject of a section 7 consultation.

XIX. ALTERNATIVE CONSIDERATIONS

A. NO ACTION

Under the No Action alternative, no Permit would be issued and Denver Water's activities involving incidental take would remain prohibited under section 9 of the Act. Activities that would avoid the incidental take of Preble's could continue. Proposed activities on non-federal land that may affect the Preble's would require an individual section 10(a)(1)(B) permit. If a Federal action (such as construction of a proposed road or interchange with federal funds) would affect Preble's, incidental take could be allowed through the consultation process outlined in section 7 of the ESA, and through the development of an incidental take statement if it was determined that the proposed action would not jeopardize the continued existence of Preble's.

B. PARTICIPATION IN COUNTY HCP'S

Under this alternative, Denver Water would participate in at least three county HCP's (Boulder, Douglas and Jefferson). Each HCP would be tailored to specific conservation and incidental take goals and objectives that may or may not completely meet the needs of Denver Water. Under this alternative Denver Water would have to sign three separate implementation agreements, thereby subjecting Denver Water to county review and approval mechanisms that otherwise do not exist. BMPs, monitoring requirements and mitigation requirements would vary depending upon which HCP applied to the particular property and activity. Furthermore, Denver Water's activities on some of its properties might not be addressed under this alternative since it is uncertain whether the counties intend to implement an HCP. Even if all three counties do implement an HCP, there is no assurance that Denver Water's activities will be covered.

C. SINGLE STATEWIDE HCP AND ITP

This alternative would involve the development of a single HCP for the seven Colorado counties within the Preble's Range in Colorado and a single incidental take permit related to that HCP. Individual public and private landowners, including county, town, and city governments, might participate in the HCP through voluntary management programs, implementing agreements, certificates of inclusion in the single incidental take permit, sale or donation of lands to a public or private conservation organization, participation in state or federal incentive programs for land conservation, partnerships with other participants in the HCP effort, agreement to the terms of the HCP and the incidental take permit, exemption from regulation based on the terms of the HCP or permit, or other methods. Implementation of the terms of the HCP might require an intergovernmental agreement with each local government whose boundaries include a participating landowner.

D. PREFERRED ALTERNATIVE

Denver Water's preferred alternative is the development of a single incidental take permit achieved through this HCP, with Denver Water as the sole Permit holder. The Permit will address foreseeable and routine activities necessary to operate and maintain Denver Water's water supply and delivery system.

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APPENDIX 1
HCP TEAM

Project Leader:	Jenny McCurdy, Environmental Planner, Denver Water
Attorney:	Anne Winans, Denver Water
Biologist	Mark Bakeman, Ensight Technical Services

APPENDIX 2 – TABLES

TABLE 1

Preble's Meadow Jumping Mouse Linear Density and Population Estimates From Multiple Sites in Colorado

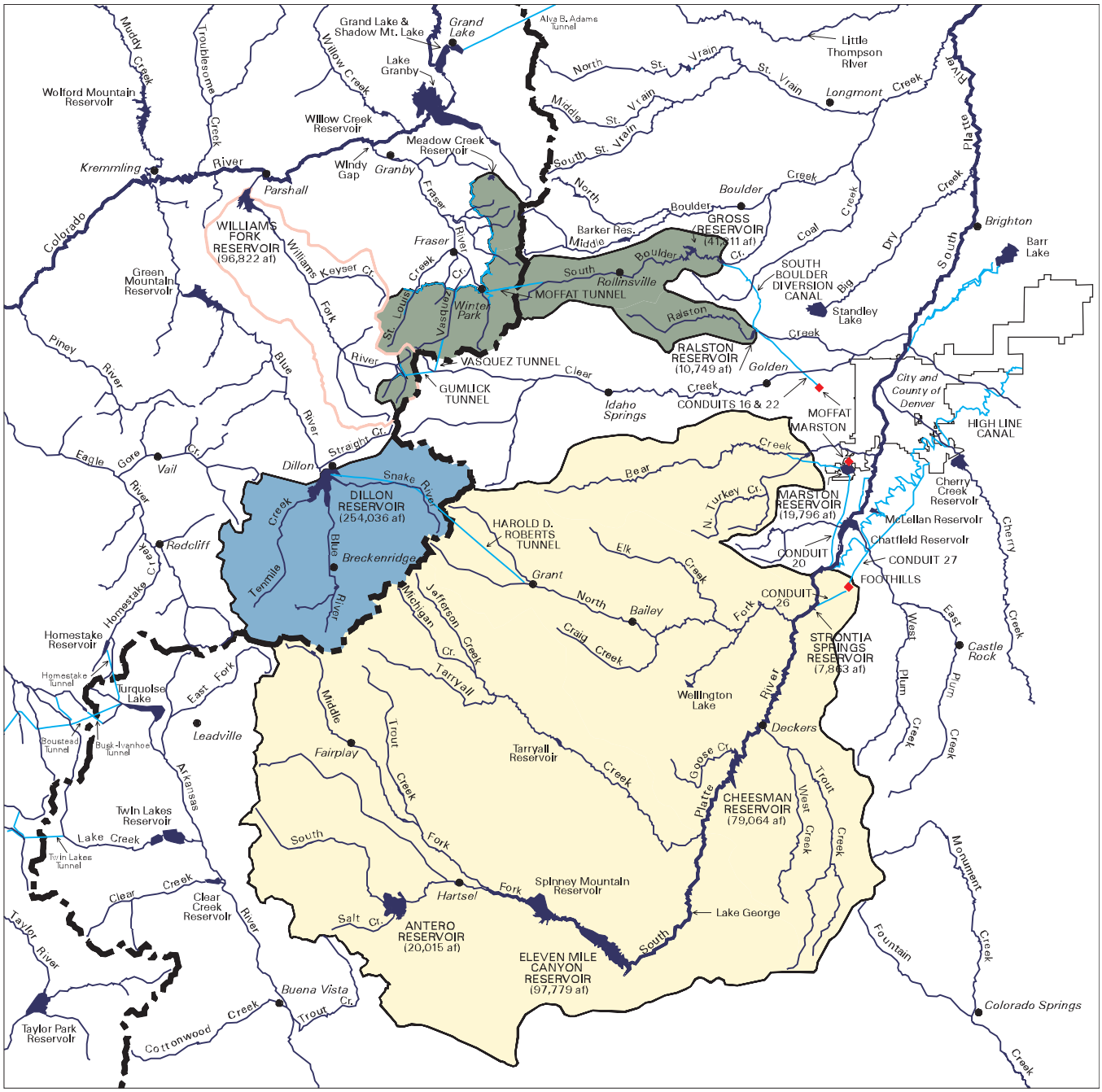
Investigator	Study Area	County	Year	Adjusted Mean Linear Density (mice km^{-1})	Standard Error Adjusted Density	Stream length (km) in Study Area	95% Confidence Interval of # Mice in Study Area
Tanya Shenk	Maytag	Douglas	1998	32.52	5.84	0.84	18-37
Tanya Shenk	Maytag	Douglas	1999	29.04	3.05	1.42	33-50
Tanya Shenk	Pinecliff	Douglas	1998	57.35	18.39	0.74	16-69
Tanya Shenk	Pinecliff	Douglas	1999	53.79	5.52	0.74	32-48
Tanya Shenk	Woodhouse	Douglas	1998	15.52	3.14	0.50	5-11
Tanya Shenk	Woodhouse	Douglas	1999	48.52	3.52	0.50	21-28
Mark Bakeman	Dirty Woman Creek	El Paso	1998	20.46	7.29	3.95	24-137
Mark Bakeman	Dirty Woman Creek	El Paso	1999	6.89	2.11	2.68	7-30
Mark Bakeman	Castle Rock	Douglas	1999	41.7	26.91	3.03	0-286
Mark Bakeman	Castle Rock	Douglas	2000	26.4	16.58	3.03	0-178
Mark Bakeman	Kettle Creek	El Paso	2000	18.84	6.89	6.12	32-198
Rob Schorr	Monument Creek	El Paso	1998	47.92	5.58	1.57	58-92
Rob Schorr	Monument Creek	El Paso	1999	47.92	9.24	1.57	47-104
Carron Meaney	South Boulder Creek	Boulder	1998	47.8	10.1	4.45	123-304
Carron Meaney	South Boulder Creek	Boulder	1999	37.4	7.1	4.45	103-231
Carron Meaney	South Boulder Creek	Boulder	2000	40.5	17.0	4.45	29-332
Tom Ryon	Walnut Creek	Jefferson	1999	5.1	3.34	6.01	0-71
Tom Ryon	Rock Creek	Jefferson	1998	3.8	0.36	14.13	44-64

Table 2
Summary of Board's HCP for the Preble's Meadow Jumping Mouse

Property	*Potential Habitat Acreage*	*Occupied Habitat Acreage*	*Foreseeable Covered Activities & Potential Adaptive Management Activities*	*Temporary Habitat loss (acres/yr)*	*Foreseeable Permanent Habitat Loss (acres)*	*Mitigation Strategy*
South Boulder Creek below Gross Reservoir, including Spring Brook	239	17	No Foreseeable Covered Activities	0	0	Conservation
South Boulder Canal stream crossings at Coal Creek and Doudy Draw	7	17	Replace siphons with below grade pipe	10	<<<<1	Conservation, restoration of temporary disturbance
Ralston Creek above reservoir		13	Convert ditch to pipe	<1	0	Conservation; Enhance-ment by creating upland habitat, restoration of temporary disturbances
Conduit 26	384		No Foreseeable Covered Activities	0	0	Conservation; restoration of temporary disturbances
Kassler	709		Recreation Improvements, Conduit W construction	3	<<<1	Conservation, restoration of temporary disturb-ances, Creation of habitat
Foothills	255		Sewage line construction, Treated water conduit construction, treatment plant expansion	6.5	?	Conservation; restoration of temporary disturbances
Strontia Springs Reservoir	45		Sediment Removal	25	?	Conservation; restoration of temporary disturbances
High Line Canal near Plum Creek		49	Conduit construction, High Line Canal Efficiency Improvements	2		Ditch maintenance as specified in BMPs to manage as linkage corridor
Upper South Platte Lands	2683	105	No Foreseeable Covered Activities	<<1	<<< 1	Restoration of temporary disturbances
Cheesman	1620		No Foreseeable Covered Activities	<<1	0	Restoration of temporary disturbances
Rangewide			Operations and Maintenance	27		
Total	**5942**	**201**		≤74	<<< 1	

APPENDIX 3
HABITAT CONSERVATION PLAN FIGURES

City and County of Denver
Board of Water Commissioners
Water Collection System



LEGEND

- South Platte Collection System
- Roberts Tunnel Collection System
- Moffat Collection System
- Williams Fork Reservoir Watershed
- Denver Water Treatment Plant
- Continental Divide
- Major Stream or River
- Major Canal or Tunnel
- Major Lake or Reservoir
- Town

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Figure 1

DRAFT

July 02, 2002

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DENVER WATER

Filename: /gis/projects/prebles/hcp/dws-sys-8x11-fig1.aml

Northern Permit Boundary Map

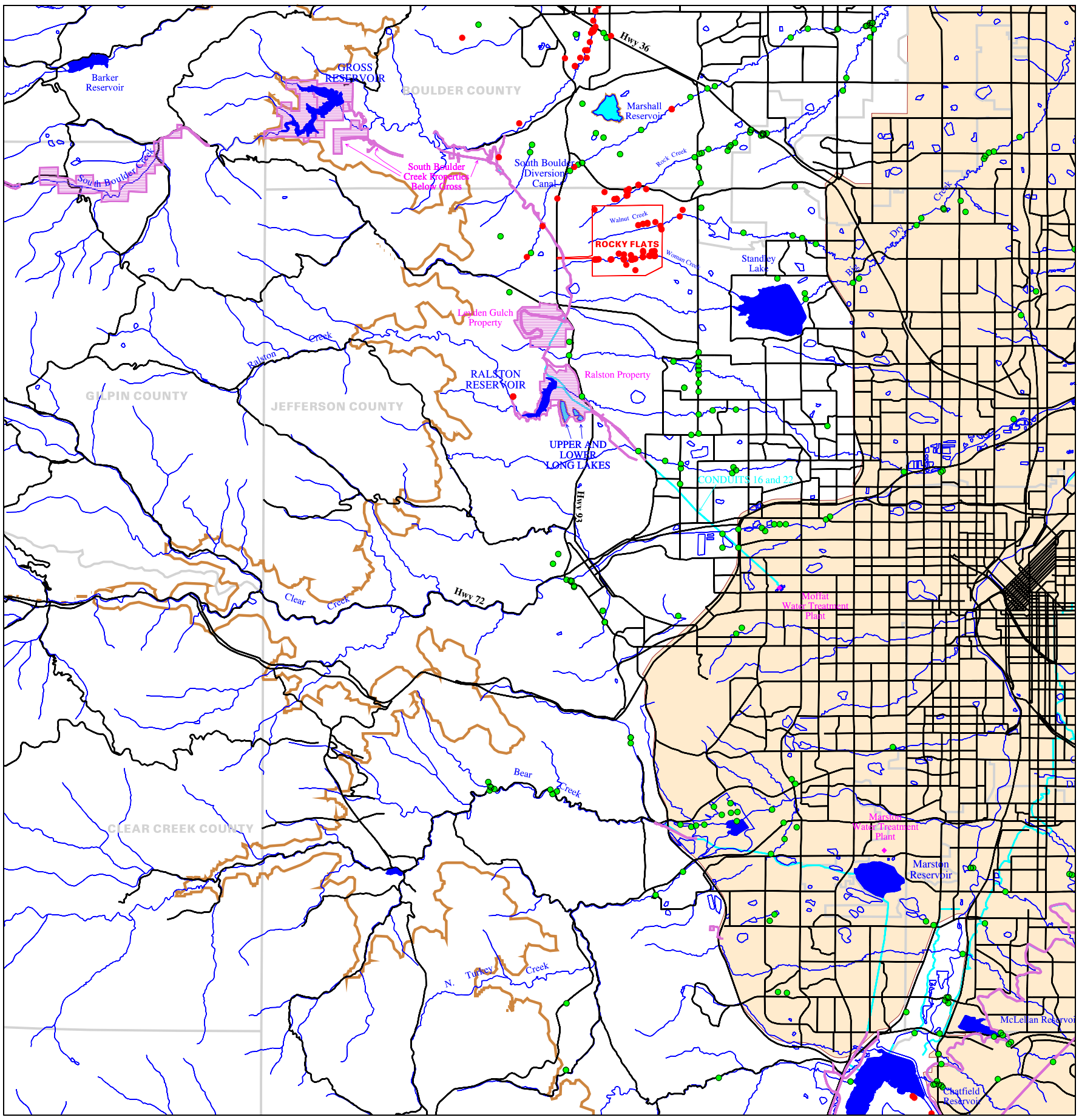

Figure 2

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Planning & Water Resources Division

The primary source of spatial data used to produce this map is the 1:24,000 scale Digital Line Graphs from the U.S. Geological Survey. Land Ownership data was obtained from Denver Water Property Administration records. The "Preble's Block Clearance Area" was digitized by ERO Resources. Preble's data points were obtained from the U.S. Fish and Wildlife Service. This map is not intended to be used for survey or engineering purposes.

DENVER WATER

January 02, 2003

Filename: /gis/projects/prebles/hcp/preb-run-no.aml

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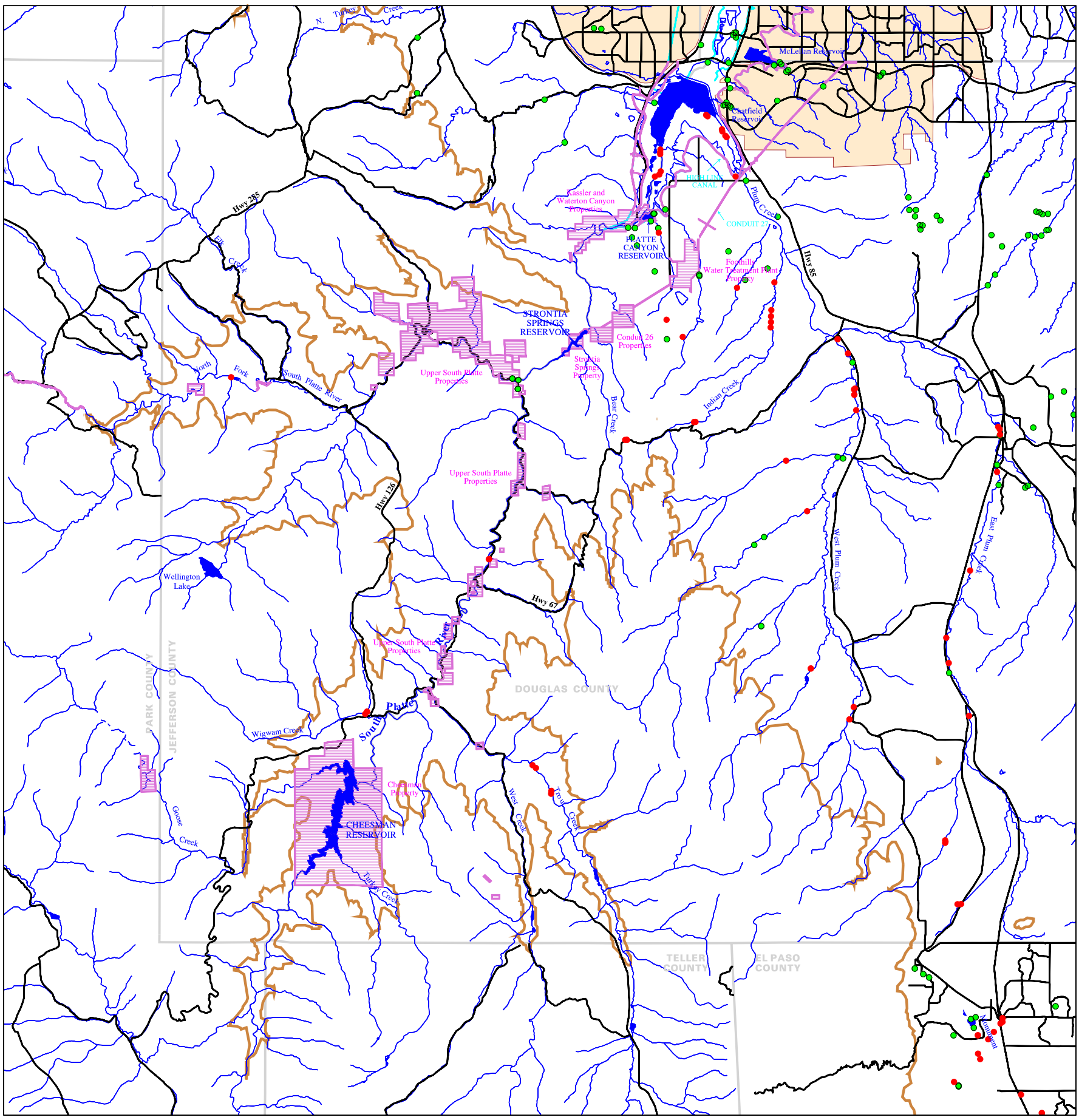
Southern Permit Boundary Map



Planning & Water Resources Division

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Figure 3

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DENVER WATER

January 02, 2003

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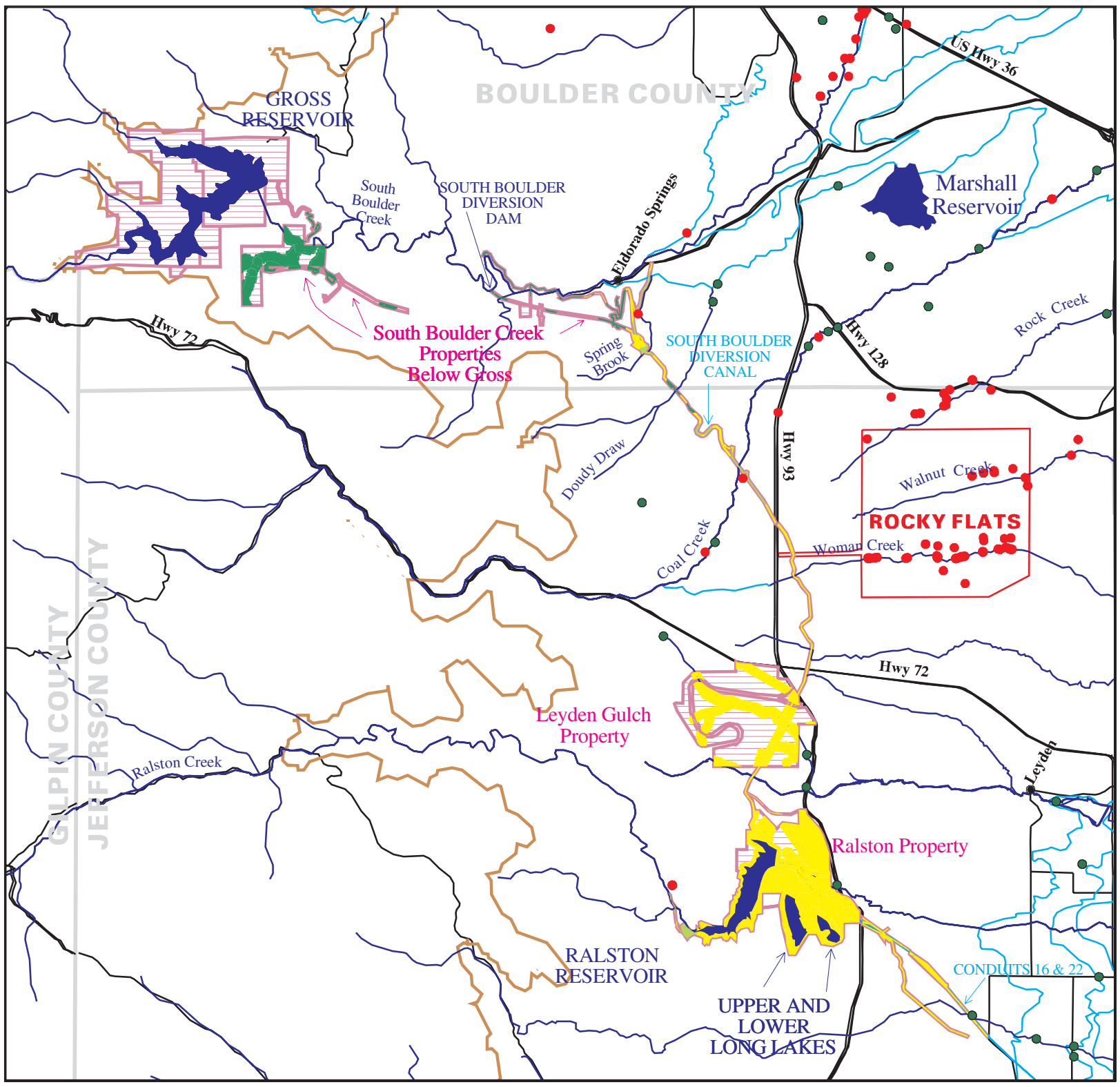
North Conservation Zone



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January 02, 2003

Filename: /gis/projects/prebles/hcp/preb-run-map.aml

Plot file: preb-run-map-nort.gra

LEGEND

- Denver Water Property
- Preble's Block Clearance Area
- 7600-ft. Elevation Line
- County Boundary
- Road
- Canal, Tunnel or Ditch
- Stream or River
- Lake or Reservoir
- Town

Prebles Mouse Points

- -- trapped not found
- -- trapped and found

Prebles Habitat Suitability

*** Habitat Conservation Zone**

- Potential (*)
- Occupied (*)
- Unsuitable

Planning & Water Resources Division

The primary source of spatial data used to produce this map is the 1:24,000 scale Digital Line Graphs from the U.S. Geological Survey. Land Ownership data was obtained from Denver Water Property Administration records. The "Preble's Block Clearance Area" was digitized by ERO Resources. Preble's data points were obtained from the U.S. Fish and Wildlife Service. This map is not intended to be used for survey or engineering purposes.

Figure 4

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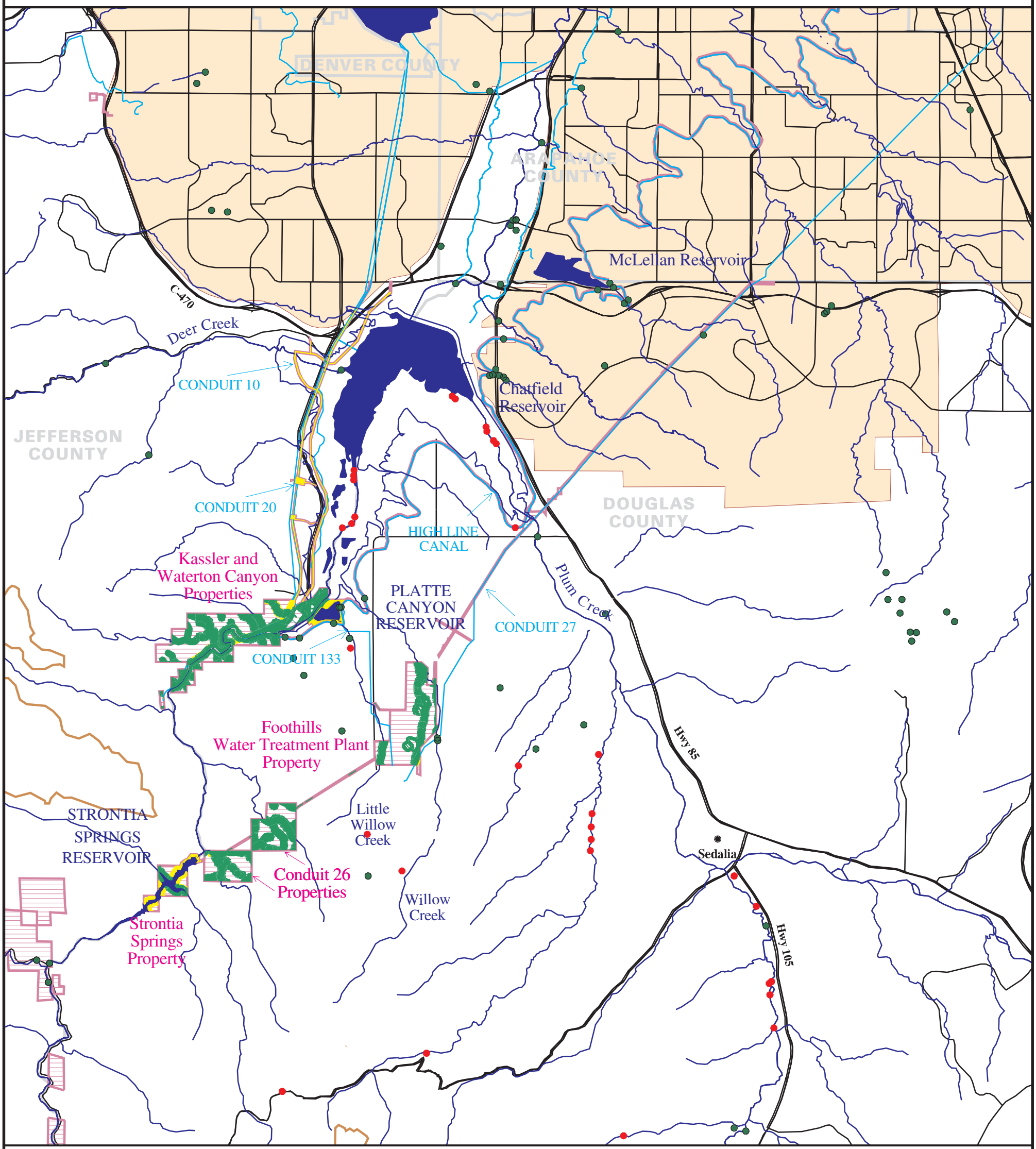
DENVER WATER

South Conservation Zone



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LEGEND

- Denver Water Property
- Preble's Block Clearance Area
- 7600-ft. Elevation Line
- County Boundary
- Road
- Canal, Tunnel or Ditch
- Stream or River
- Lake or Reservoir
- Town

Prebles Mouse Points

- -- trapped not found
- -- trapped and found

Prebles Habitat Suitability

* Habitat Conservation Zone

- Potential (*)
- Occupied (*)
- Unsuitable

Planning & Water Resources Division

The primary source of spatial data used to produce this map is the 1:24,000 scale Digital Line Graphs from the U.S. Geological Survey. Land Ownership data was obtained from Denver Water Property Administration records. The "Preble's Block Clearance Area" was digitized by ERO Resources. Preble's data points were obtained from the U.S. Fish and Wildlife Service. This map is not intended to be used for survey or engineering purposes.

Figure 5

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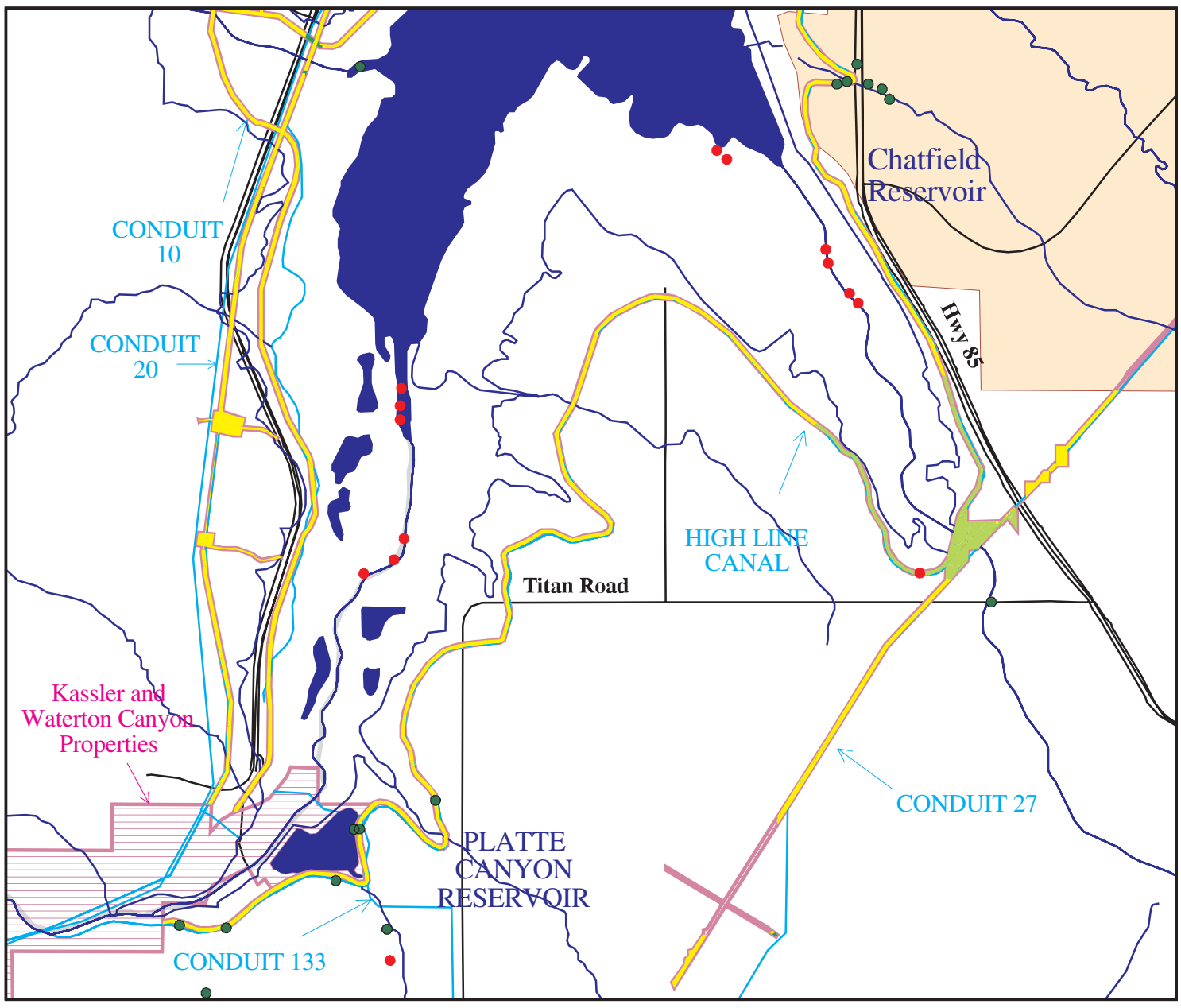
DENVER WATER

High Line Canal Conservation Zone



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January 02, 2003

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Plot file: preb-run-map-hilc.gra

LEGEND

- Denver Water Property
- Preble's Block Clearance Area
- 7600-ft. Elevation Line
- County Boundary
- Road
- Canal, Tunnel or Ditch
- Stream or River
- Lake or Reservoir

Prebles Mouse Points
- -- trapped not found
- -- trapped and found

Prebles Habitat Suitability
* Habitat Conservation Zone
- Potential (*)
- Occupied (*)
- Unsuitable (*)

Planning & Water Resources Division

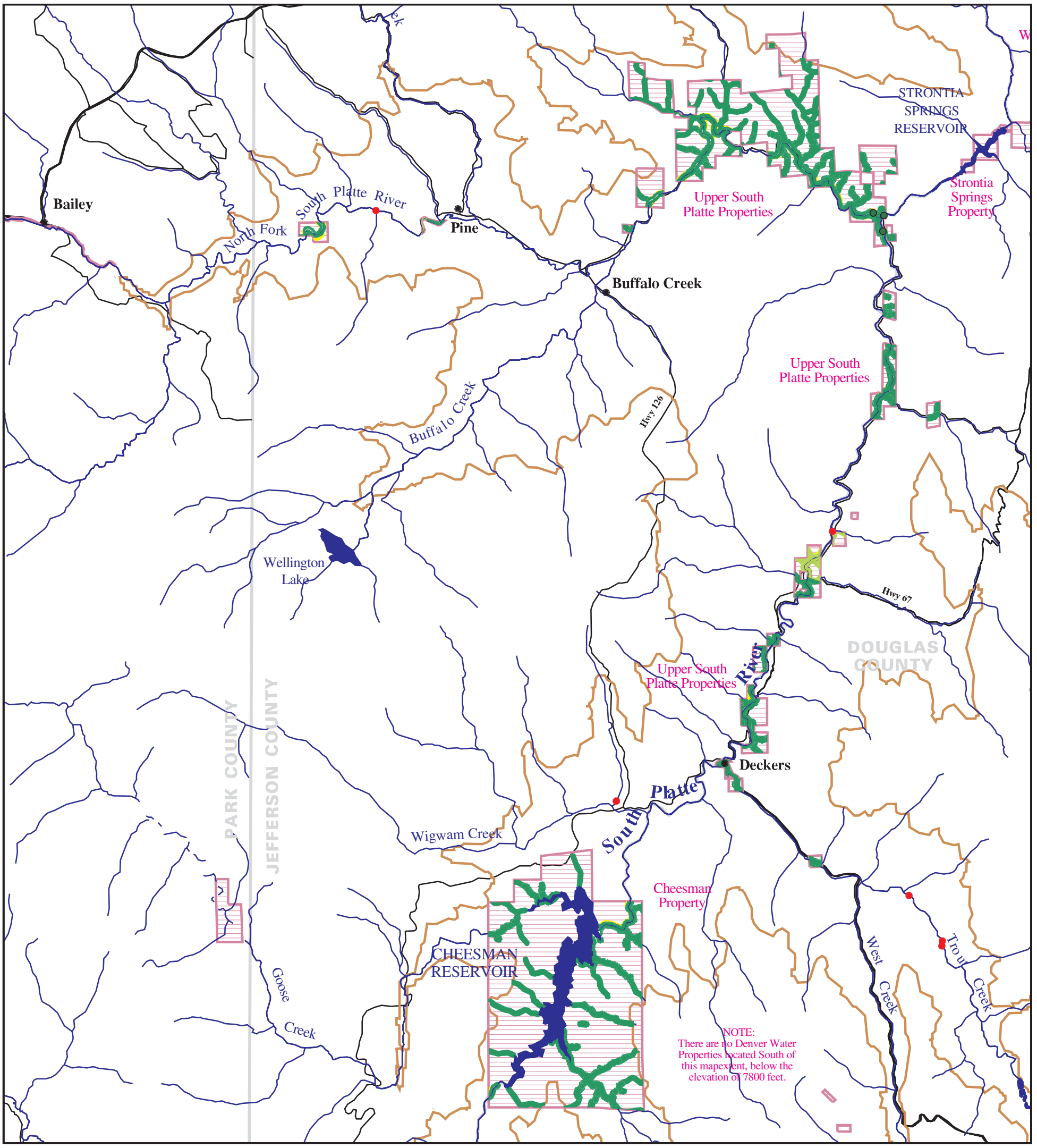
The primary source of spatial data used to produce this map is the 1:24,000 scale Digital Line Graphs from the U.S. Geological Survey. Land Ownership data was obtained from Denver Water Property Administration records. The "Preble's Block Clearance Area" was digitized by ERO Resources. Preble's data points were obtained from the U.S. Fish and Wildlife Service. This map is not intended to be used for survey or engineering purposes.

Figure 6

DRAFT

DENVER WATER

Upper South Platte Properties



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January 02, 2003

Filename: /gis/projects/prebles/hcp/preb-run-map.aml

Plot file: preb-run-map-upsp.gra

LEGEND

- Denver Water Property
- Preble's Block Clearance Area
- 7600-ft. Elevation Line
- County Boundary
- Road
- Canal, Tunnel or Ditch
- Stream or River
- Lake or Reservoir
- Town

Prebles Mouse Points

- -- trapped not found
- -- trapped and found

Prebles Habitat Suitability

- Potential
- Occupied
- Unsuitable

Planning & Water Resources Division

The primary source of spatial data used to produce this map is the 1:24,000 scale Digital Line Graphs from the U.S. Geological Survey. Land Ownership data was obtained from Denver Water Property Administration records. The "Preble's Block Clearance Area" was digitized by ERO Resources. Preble's data points were obtained from the U.S. Fish and Wildlife Service. This map is not intended to be used for survey or engineering purposes.

Figure 7

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DENVER WATER

APPENDIX 4
CRITICAL HABITAT MAPS

Overview of Overlap Areas

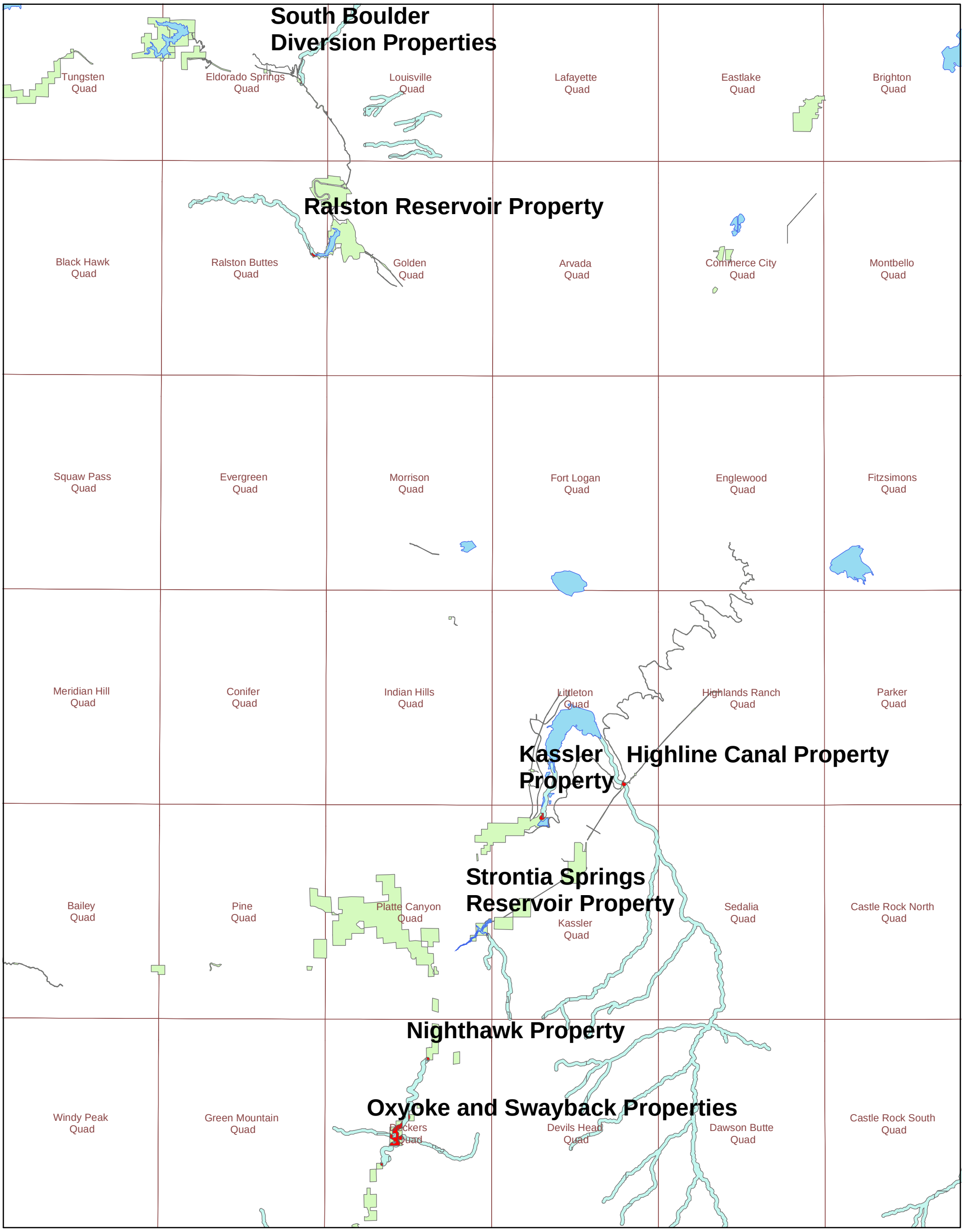
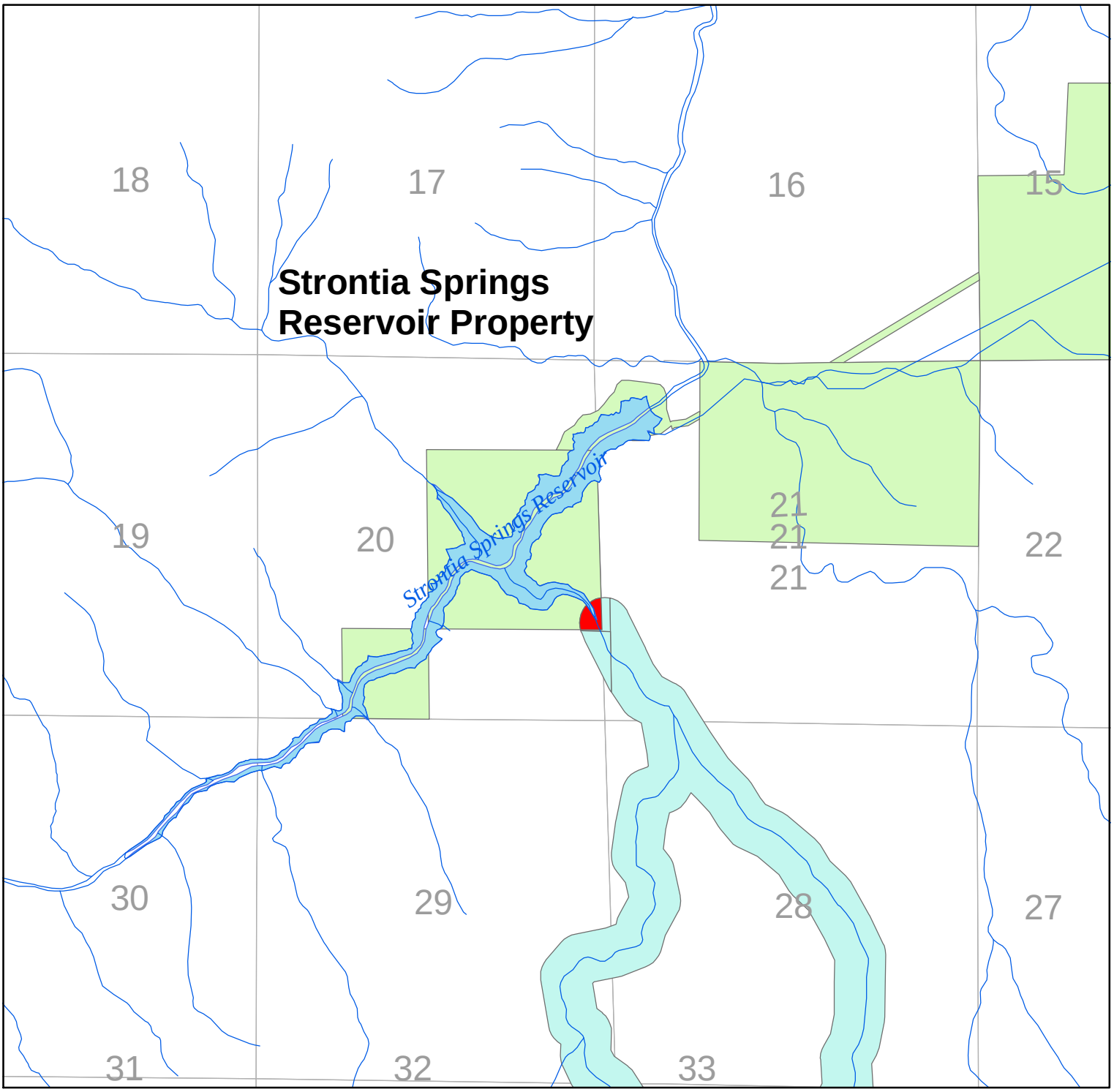


Figure 1

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
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Proposed Critical Habitat
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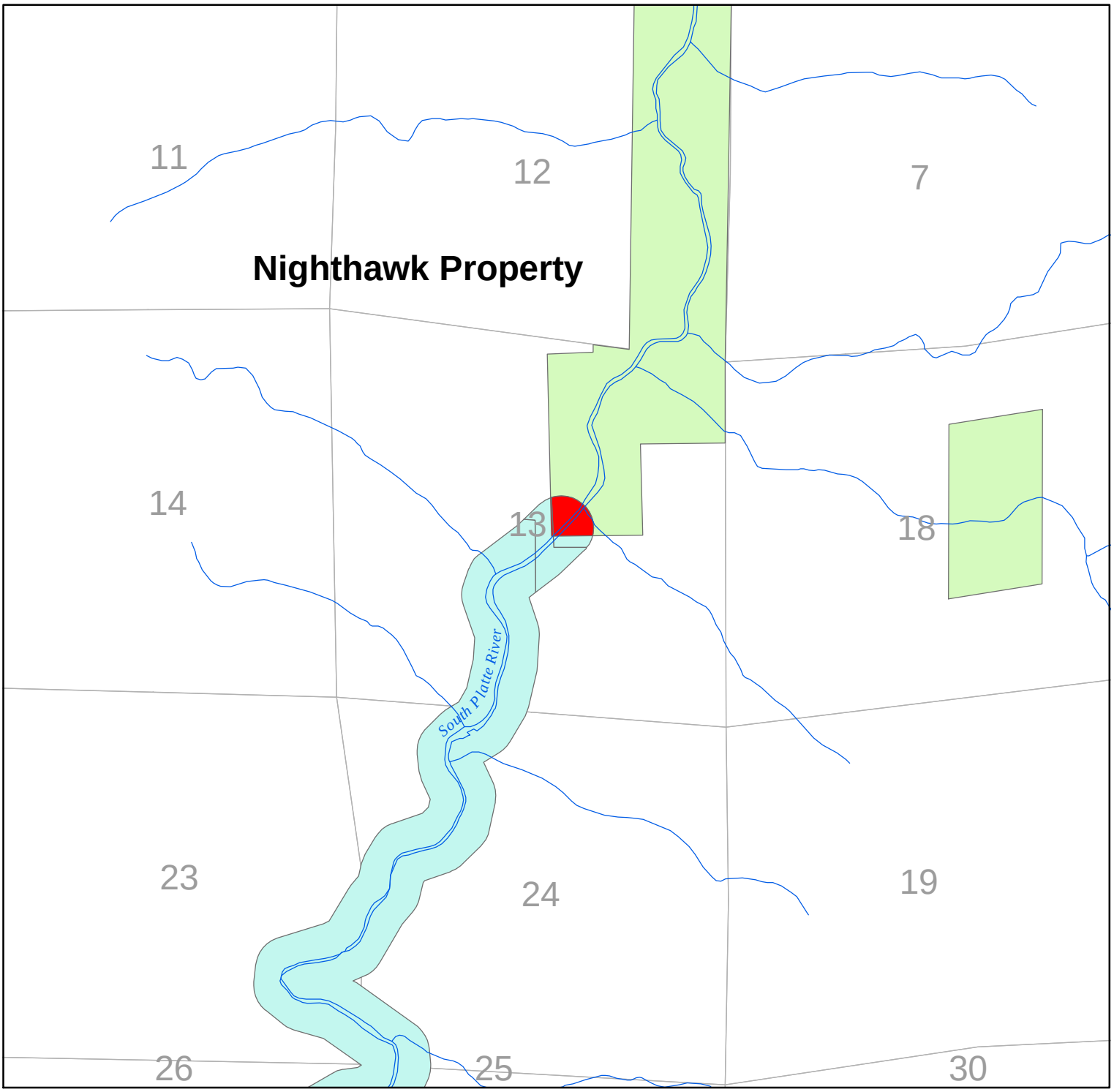
Figure 2

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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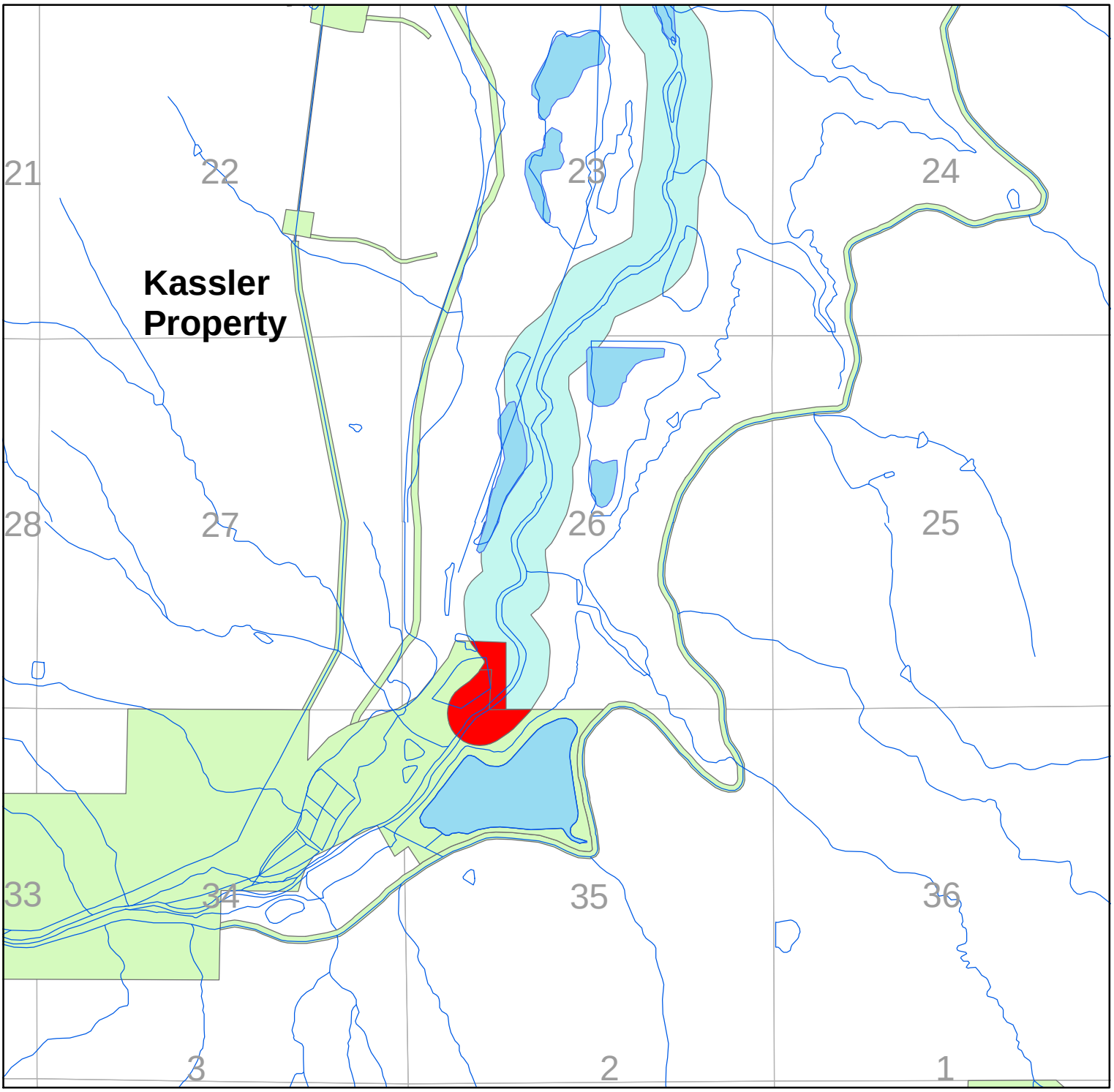
Figure 3

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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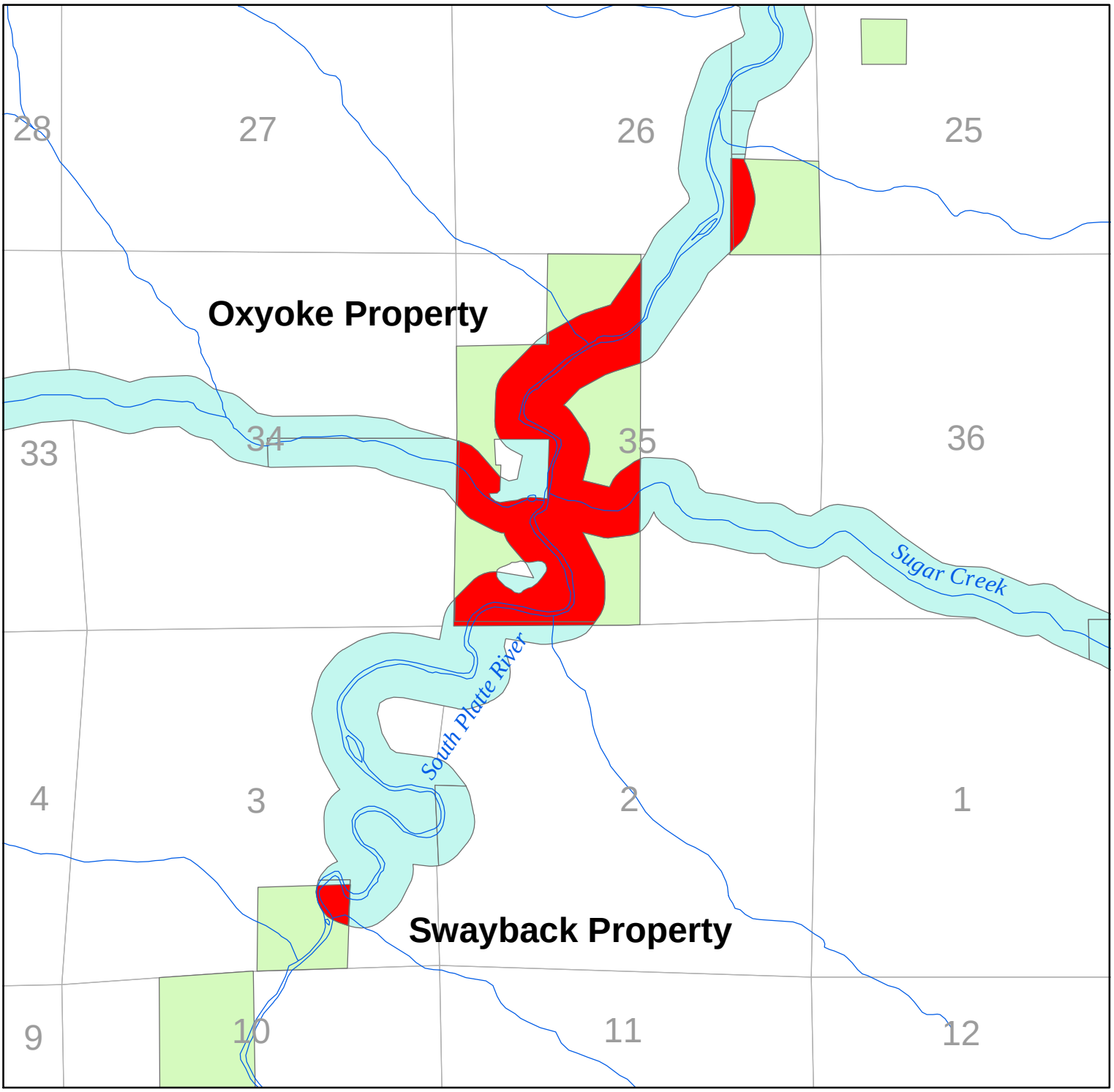
Figure 4

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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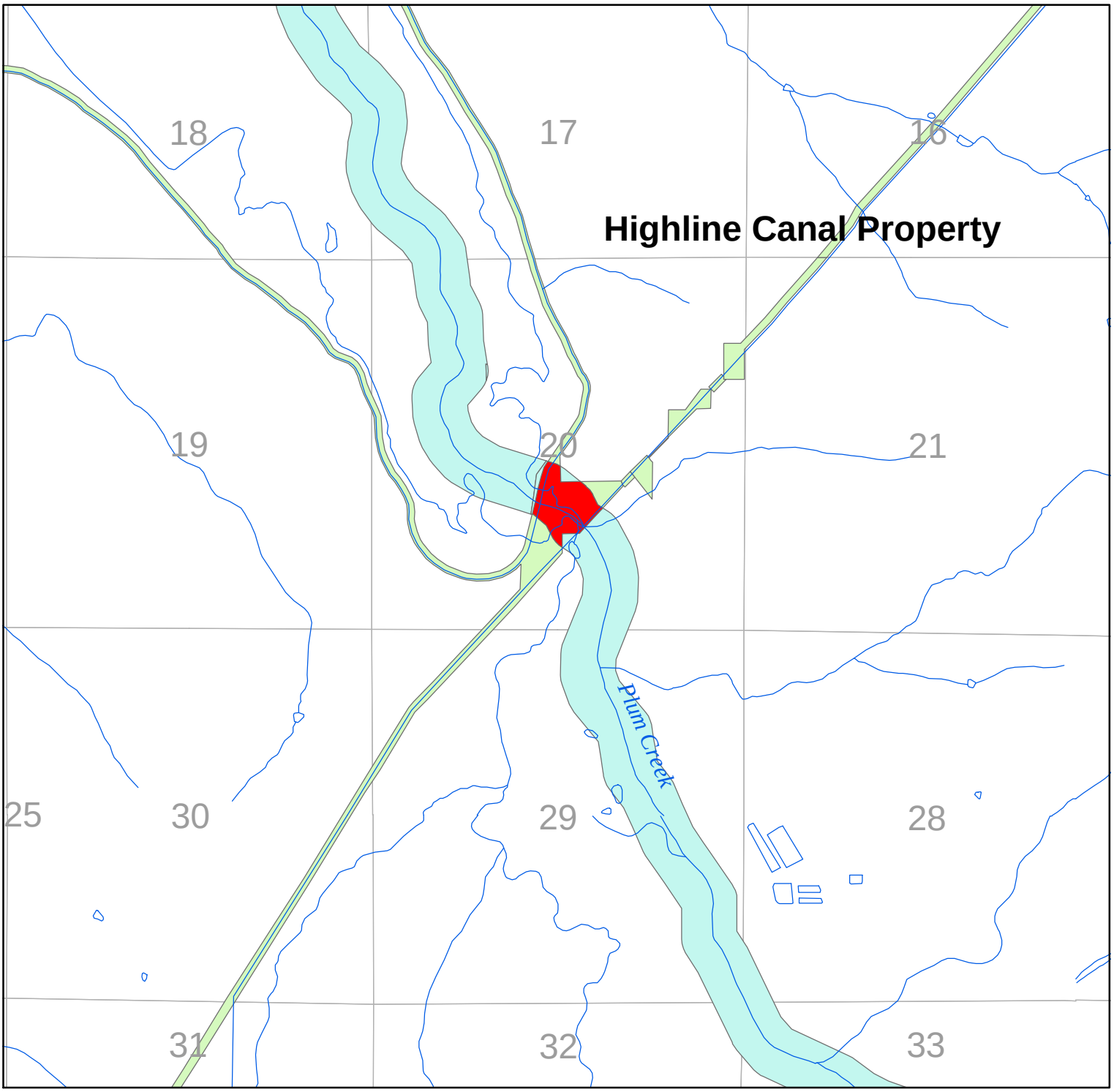
Figure 5

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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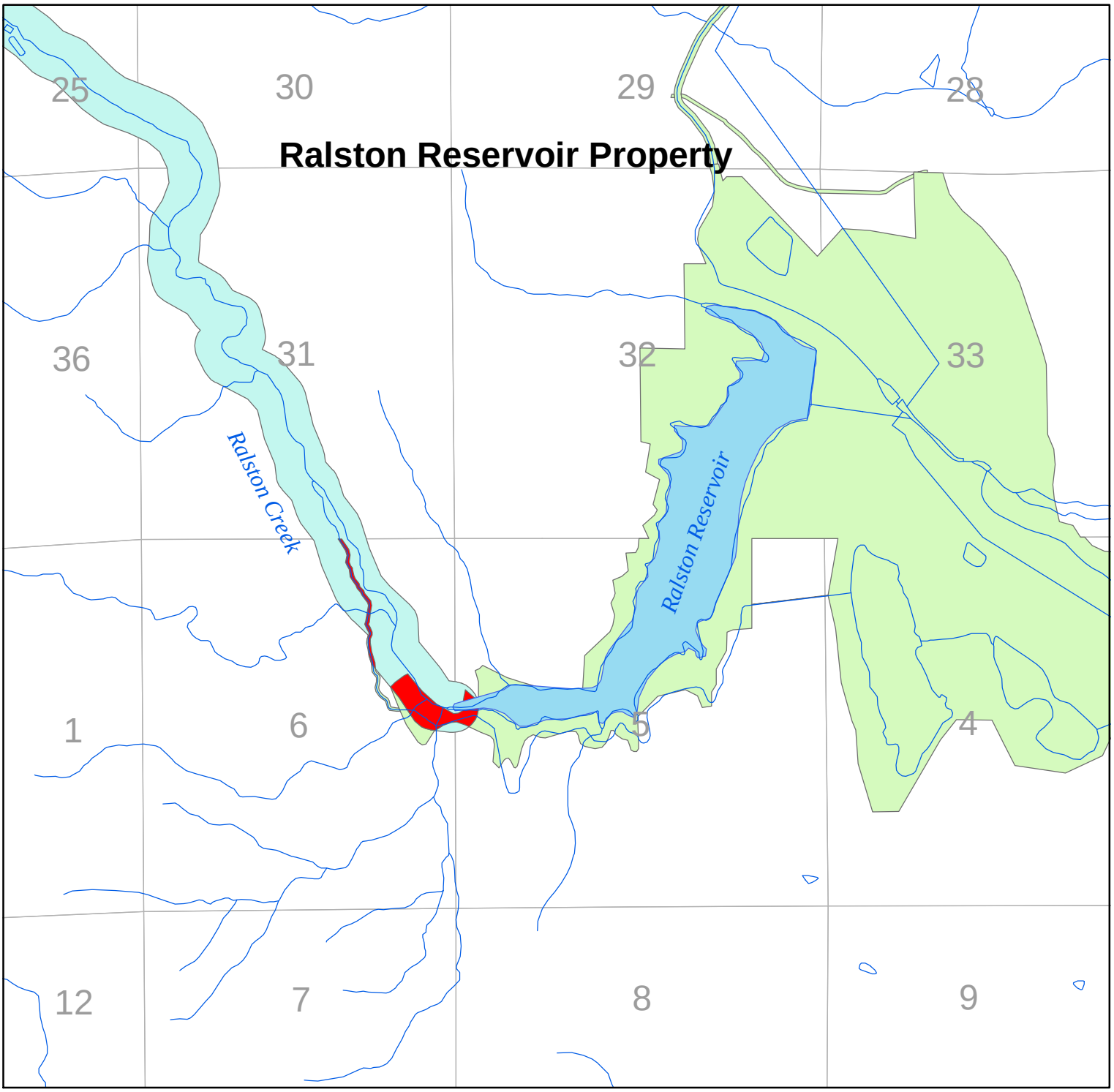
Figure 6

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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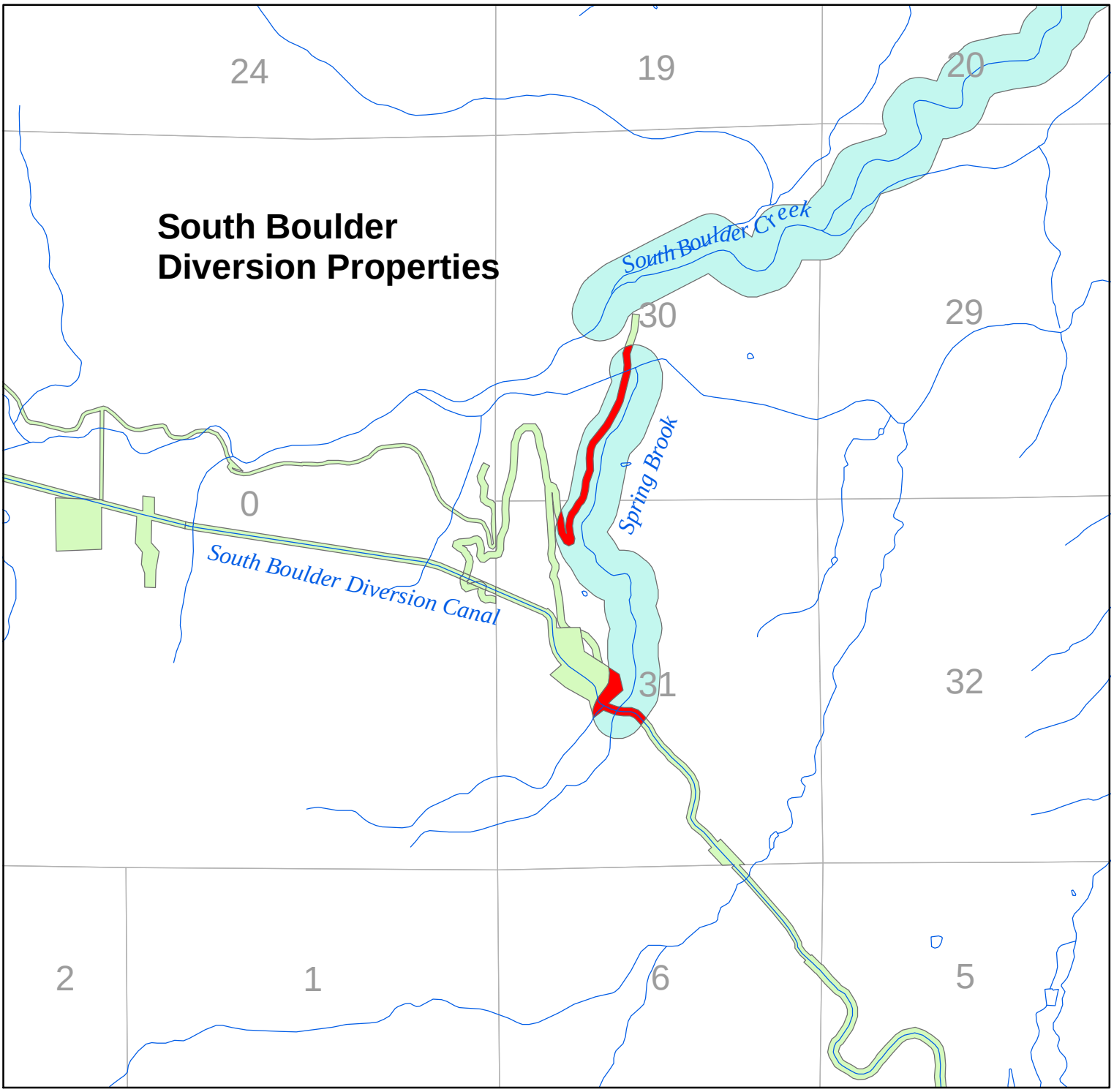
Figure 7

DENVER WATER

Denver Water Property within Proposed Critical Habitat



Streams
Reservoirs
Disputed Overlaps
Proposed Critical Habitat
Denver Water Property
PLS Section Lines

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Figure 8

DENVER WATER

APPENDIX 5

BMPS

I. GENERAL BMPS:

All of the following BMPs will be used when they are applicable and practicable:

- Identify and Prioritize Preble's habitat areas that are subject to disturbance and design activities to avoid areas of high habitat value whenever possible. For example, large willow patches or prime hibernation areas should be avoided.

- Explore options with project designers to reduce or avoid impacts to Preble's habitat. For example, talk to equipment operators to find out where they will drive.

- Limit equipment entrance/exit areas to a single location whenever possible.

- Limit vegetation disturbance through alternative actions. For example, prune trees/shrubs rather than remove trees/shrubs; cut shrub stems to allow re-growth rather than grubbing out the entire root system.

- Fence and sign Preble's habitat to establish no-work zones in proximity to the project area.

- Schedule project activities during the Preble's dormant season when possible.

- Restore areas of temporary disturbance to pre-disturbance grades and revegetate(?) with an approved seed mix.

- Revegetate disturbed Preble's habitat soon after the activity has been completed in accordance with the recommended seasons for revegetation and with practices conducive to achieving Success Criteria.

- Utilize sediment and erosion control devices during revegetation as needed to achieve Success Criteria.

- Replace trees and shrubs removed during construction to Success Criteria.

- Use fertilizer when the results of soil nutrient analysis indicate that such use would be beneficial. Do not over apply fertilizer, and use a slow-release type. Avoid application when there is a high probability of heavy rain.

- Avoid excess application and introduction of chemicals into aquatic ecosystems. Limit the use of chemicals such as soil stabilizers, dust palliatives, sterilants, growth

inhibitors, fertilizers, de-icing salts, etc. during construction and maintenance operations.

- Prevent spilled fuels, lubricants or other toxic materials from entering Preble's habitat.

- Minimize use of heavy machinery and use smaller equipment if it is feasible and will cause less disturbance.

- Do not clean equipment in Preble's habitat or in areas where runoff will enter Preble's habitat.

- Use matting in soft and unstable soils to minimize erosion, rutting and damage to soils.

- Operate equipment from banks or shoulders above riparian and wetland areas.

- Avoid activities in Preble's habitat if the probability of precipitation is high to minimize erosion and rutting.

- Minimize temporary disturbance to and permanent loss of woody riparian vegetation. Avoid blading and grubbing of woody vegetation in areas of temporary disturbance. Woody vegetation should be cut to ground level in areas of temporary disturbance without removing the root mass.

- Avoid placing staging areas in Preble's habitat and minimize runoff from staging areas into Preble's habitat.

- Conduct non-emergency activities in or adjacent to active streams during periods of low flow.

- Stockpile topsoil that is removed from riparian areas to return to the excavation site. Place stockpiled material outside Preble's habitat and protect is from streamflows or runoff.

II. BMPS FOR BURIED AND AERIAL UTILITY LINES

All of the following BMPs, in addition to the general BMPs, will be used in an effort to minimize or avoid impacts when they are applicable and practicable during the construction, repair, rehabilitation, replacement, and maintenance of buried and aerial utility lines. A "utility line" is any pipe or pipeline used for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, and any cable, line, or wire for the transmission of electrical energy. Utility lines also include associated features, such as manholes, water valves, blow-off valves, fire hydrants, air-vac assemblies, and transmission poles, towers, launches, anchors and pads.

- During construction or replacement of foundations for utility line towers, poles and anchors, use the minimum size required that is consistent with sound engineering practices and safety requirements.

- When burying utility lines, salvage and stockpile topsoils. Replace the topsoil when the trench is backfilled. If topsoil cannot be salvaged, reclaim the disturbed area.

III. BMPS FOR BANK STABILIZATION

All of the following BMPs, in addition to the general BMPs, will be used when they are applicable and practicable during the construction and maintenance of bank stabilization. Bank stabilization includes the placement of riprap, riprap bedding and/or geotextile fabric. Activities commonly associated with bank stabilization include access, excavation, and filling.

- Bury riprap and plant with woody vegetation.

- Stabilize streambanks using approved seed mixes and plant materials.

- When clearing vegetation to facilitate bank stabilization, trim woody plants to ground level without removing the root mass unless the roots create a seepage problem or present a significant threat of seepage and/or bank failure at that location.

- Limit area of bank repair, excavation, re-contour or replacement of fill to just the area needing repair.

IV. BMPS FOR EMERGENCY SITUATIONS

All of the following BMPs, in addition to the general BMPs will be used when they are applicable and practicable during the emergency repair or protection of existing facilities and/or cleanup of toxic or hazardous materials. Emergency situations are those activities that must be done immediately to protect public health or safety or prevent imminent loss of human life or property. Examples of emergency activities include: repairs of structures damaged by flood where repair cannot be delayed due to eminent loss of life or property; cleanup of spilled toxic or hazardous materials; repair,

replacement or removal of failed structures and facilities; repair of structures or facilities eminently in danger of serious damage or failure; cleanup and stabilization of landslides, slope failure, and debris flows; fire suppression and mitigation; snow removal activities; response to accidents; emergency road closures and re-routes; clean-up of tree blow-downs on roads; removal of beaver dams that may cause flooding of facilities; and emergency sedimentation and erosion control activities.

- Remove or clear travel corridor accidents.

- Minimize disturbances from emergency repairs and clean up when within Preble's habitat.

V. BMPS FOR BRIDGES

All of the following BMPs, in addition to the general BMPs, will be used when they are applicable and practicable during the construction, repair, rehabilitation and maintenance of bridges.

- Construct new bridges to allow for the passage of mice.

- In accordance with bank stabilization BMPs, use riprap to protect bridges.

- Divert highway runoff from new bridges away from stream channel and associated riparian areas. Where it is necessary to divert into the stream channel, construct water holding or silt-filtration basins of adequate size outside of Preble's habitat.

VI. BMPS FOR TEMPORARY ACCESS ROADS

All of the following BMPs, in addition to the general BMPs, will be used when they are applicable and practicable during the construction of temporary access roads. A "temporary access road" is defined as any road or passage route that is needed to temporarily access a facility for construction, repair, replacement, rehabilitation or maintenance activities. Temporary road detours or "shooflies" also are considered temporary access roads and are covered by this HCP.

- Restore disturbed areas associated with construction and use of the temporary access road through general revegetation BMPs.

- Remove temporary aggregate cover or paving when the temporary road is restored.

- Use fill materials that will not cause increases in pollution for temporary road crossings.

- If temporary culverts are installed, imbed and backfill temporary culverts 12 inches into channel substrate. Remove culverts as part of road restoration.

- Restore drainage crossings to preconstruction grades, contours and conditions.

- Prevent erosion during construction of drainage crossings.

- Use materials for constructing temporary crossings that come from areas outside of Preble's habitat, and return them to areas outside of Preble's habitat when construction is complete.

- Avoid routing runoff from roads directly into drainages.

- Do not use temporary access roads longer than the time specified by the permitting county.

- Reuse access corridors for subsequent repairs, maintenance and rehabilitation.

VII. BMPS FOR TRAIL CONSTRUCTION

All of the following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the construction, repair and maintenance of trails.

- Design trail alignment to avoid and minimize impacts on Preble's habitat.

- Post signs along trails in Preble's habitat that pets are required to be on leash and to be confined to the trails.

- Place stream crossings adjacent to existing roads, culverts, bridges or developments to avoid fragmentation of Preble's habitat.

- Design trails in Preble's habitat to have the shortest route through Preble's habitat if it will minimize disturbance to Preble's habitat.

VIII. BMPS FOR STORMWATER FACILITIES AND DETENTION PONDS

All of the following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the construction, rehabilitation, repair, replacement and maintenance of stormwater facilities. Stormwater facilities and detention ponds include: water storage facilities constructed to detain or retain stormwater; canals, pipes and culverts constructed to route stormwater, including inflow and outfall structures; any facility or structure constructed primarily for the purpose of stormwater treatment or management; and water storage facilities that function to trap suspended sediments from discharge into a drainage. The maintenance of stormwater facilities includes repair and rehabilitation of facilities as well as routine periodic maintenance such as sediment removal.

- Place sediment removed from stormwater facilities in locations outside Preble's habitat unless it can be used for onsite construction and/or maintenance.

- Store stockpiled material in areas outside Preble's habitat, and prevents erosion of the stockpiled material.

IX. BMPS FOR MAINTENANCE, REPAIR, WIDENING AND REALIGNMENT OF EXISTING ROADS

All of the following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the maintenance of existing roads. Repair, rehabilitation, widening, realignment, and maintenance activities on existing roads include: grading; paving or other surfacing; construction and repair of signage; construction and repair of guard rails; construction and repair of lighting; construction, repair, and maintenance of drainage directly associated with the road; sanding, de-icing, an snow removal; maintenance of ditches; back-sloping to maintain drainage; maintenance of shoulders; seeding; mowing; weed management; dust management; fence repair; delineator post repair; striping; and curbing.

- Limit maintenance and repair activities to the area within the original footprint (road and shoulders) of the existing roadway.

- Design road widening and realignment in a way that minimizes impacts on Preble's habitat.

- Minimize road runoff and erosion from entering Preble's habitat during road construction.

X. BMPS FOR FENCE CONSTRUCTION AND MAINTENANCE

All of the following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the construction, repair, replacement and maintenance of fences within Preble's habitat. This activity includes wire and wood fences, but does not include walls. Walls are, instead, defined as "structures." Silt fencing for erosion control is included in these BMPs.

- Locate and construct the fence in a manner that will allow Preble's to move beyond the fence.

- When using wire mesh fences with openings of less than 2 inches, the fence should not be "keyed in" or buried into the soil surface.

- When constructing privacy fences (fences constructed from wood or other materials), have a minimum clearance of 2 inches above the ground surface.

- "Key in" or bury into the soil temporary silt fencing that is used for erosion control at construction sites.

XI. BMPS FOR TEMPORARY STREAM DIVERSIONS AND DEWATERING OF CONSTRUCTION SITES

The following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the construction of temporary stream diversions and dewatering structures associated with the construction of roads and bridges and other activities that require the temporary rerouting of stream flows and/or dewatering construction sites.

- Temporary diversion and/or construction dewatering should typically not exceed 120 days.

- Minimize disturbances during the construction of the temporary diversion structure.

- Divert water around or through the active construction site with piping to minimize water quality contamination, siltation, and sedimentation.

- Construct the temporary diversion during the Preble's inactive season.

- Whenever possible, use chemically free fill material that will not cause a substantial increase in suspended solids or pollution when using cofferdams made of imported materials.

- Take measures to maintain near normal downstream flows and to minimize flooding.

- Place fill outside Preble's habitat and so that it will not be eroded by high flows.

- Remove temporary fill brought onto the site to areas outside Preble's habitat upon project completion.

XII. BMPS FOR WEED CONTROL

All of the following BMPs, in addition to general BMPs, will be used when they are applicable and practicable during the control of noxious weeds and non-native vegetation.

- Implement weed control pursuant to the undesirable plant management plan adopted by the applicable local government/regulatory agency.

- Implement weed control after consultation with the local government weed control officer. Consultation can include following written guidelines provided by the designated local weed control officer.

- Follow herbicide application guidelines as prescribed by herbicide manufacturers and federal law.